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THE MODEL 40 FLYING BOAT HANDBOOK

AEROMARINE PLANE AND MOTOR COMPANY
KEYPORT, N. J.

MAY, 1919

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MODEL 40 FLYING BOAT HAND BOOK.

INTRODUCTION.

This book is designed to give the current practice of handling the Model 40 Flying Boat with particular attention to unpacking and assembling. There are various methods of performing the component operations dealt with and no doubt most of these would give satisfactory results, but the following, if consistently adhered to, will give good results.

Fig. 1.—General Assembly, Front View.

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Fig. 3.—Hull with Motor Installed.

AEROMARINE MODEL 40 FLYING BOAT HAND BOOK.

SPECIFICATIONS.

1. GENERAL DIMENSIONS.

Wing Span, Upper Plane	48 feet 6 inches.
Wing Span, Lower Plane	37 feet 8 inches.
Depth of Chord	6 feet 3 inches.
Gap between Planes	6 feet 6 inches.
Stagger	8 inches.
Total Length of Machine, overall	28 feet 11 3/16 inches.
Total Height of Machine, overall	12 feet 7 inches.
Angle of Incidence, Upper Plane	3 degrees 5 min.
Angle of Incidence, Lower Plane	2 degrees.
Dihedral Angle	176 degrees.
Sweepback	None.
Angle of Incidence of Stabilizer	1 degree 30 min.

2. AREAS.

	Square feet.
Upper Planes	246.0
Lower Planes	200.0
Ailerons (each 29 sq. ft.)	58.0
Total Supporting Surface	504.0

	Square feet.
Stabilizer	39.0
Fin	15.0
Elevators	12.8

3. WEIGHTS.

	Pounds.
Hull, including Soakage	613.00
Wings, Struts, etc.	647.00
Tail Assembly	87.00

STEAM ENGINEERING EQUIPMENT.

	Pounds.
Motor, (Curtiss OXX-6. 100 H.P.)	412.50
Water	36.00
Radiator	55.00
Propeller	28.50
Gasoline Pump	3.70
Hand Pump	2.80
Gasoline Tank	33.00
Gravity Tank and Piping	9.00
Oil Piping	3.00
Spark and Throttle	3.00
Tachometers and Shafting	4.50
Oil Pressure Gauges	1.00
Thermometer	.50
Gasoline Gauge	2.75
Hand Crank	7.00
Total	602.25

ELECTRICAL EQUIPMENT.

Wiring	2.50
Inter-communicating Set	6.00
Total	8.50

CONSTRUCTION AND REPAIR EQUIPMENT.

Fire Extinguisher, (1)	7.75

NAVIGATION EQUIPMENT.

Clock	1.50
Altimeter	1.50
Total	3.00

PERSONNEL AND FUEL.

Crew (2 men at 180 pounds)	360.00
Gasoline (20 gals.) and Oil (3 gals.)	139.00
Total	499.00

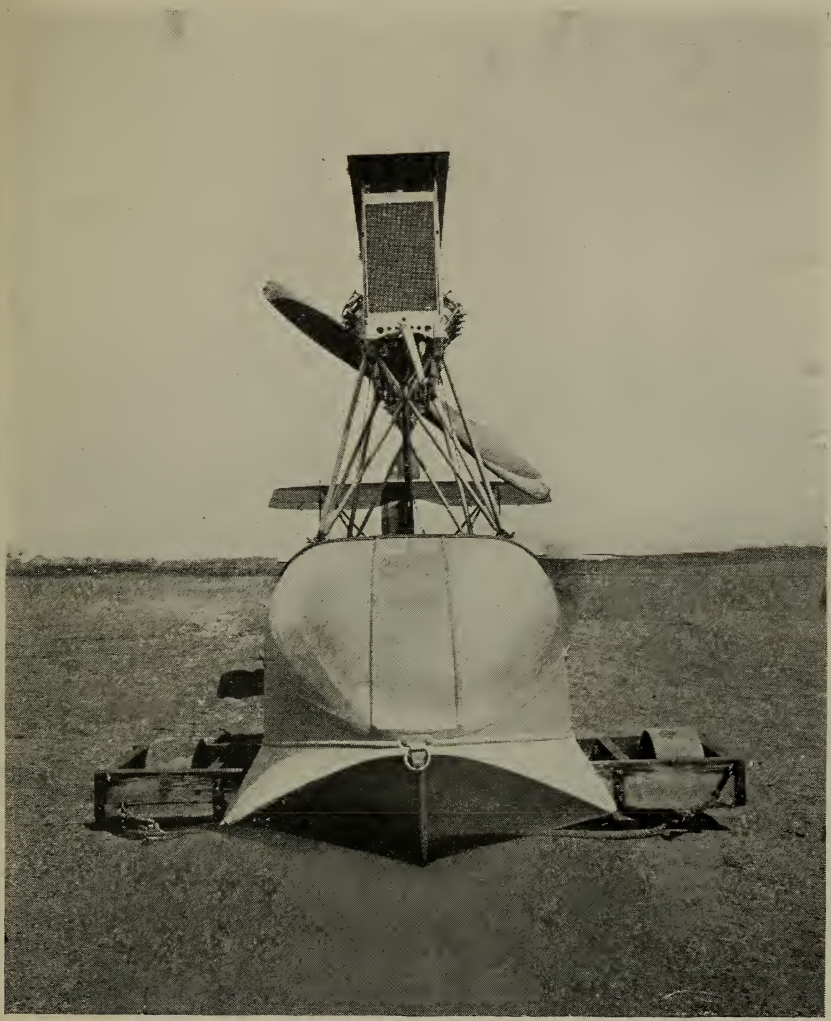


Fig. 4.—Front View, Secondary Assembly, Engine Section Complete.

SUMMARY.

	Pounds.
Hull, including Seakage	613.00
Wings, Struts, etc	647.00
Tail Assembly	87.00
Steam Engineering Equipment	602.25
Electrical Equipment	8.50
Construction and Repair Equipment	7.75
Navigation Equipment	3.00
Gasoline and Oil	139.00
Personnel	360.00
Total	2467.50

4. LOADING.

$$\frac{\text{Total Weight}}{\text{Supporting Area}} = \frac{2467}{504} = 4.99 \text{ pounds per square foot.}$$

$$\frac{\text{Total Weight}}{\text{Rated Horse Power}} = \frac{2467}{100} = 24.67 \text{ pounds per rated horsepower.}$$

5. MOTOR.

Bore and Stroke	4¼″ x 5″.
Fuel Consumption per hour	55 pounds.
Fuel Tank Capacity	39.5 gallons.
Oil Capacity	3 gallons.
Fuel Consumption per horsepower per hour	0.55 pounds.
Oil Consumption per horsepower per hour	.0128 pounds.

6. PERFORMANCE.

Speed, Maximum, Horizontal Flight	72 miles per hour.
Speed, Minimum, Horizontal Flight	40 miles per hour.

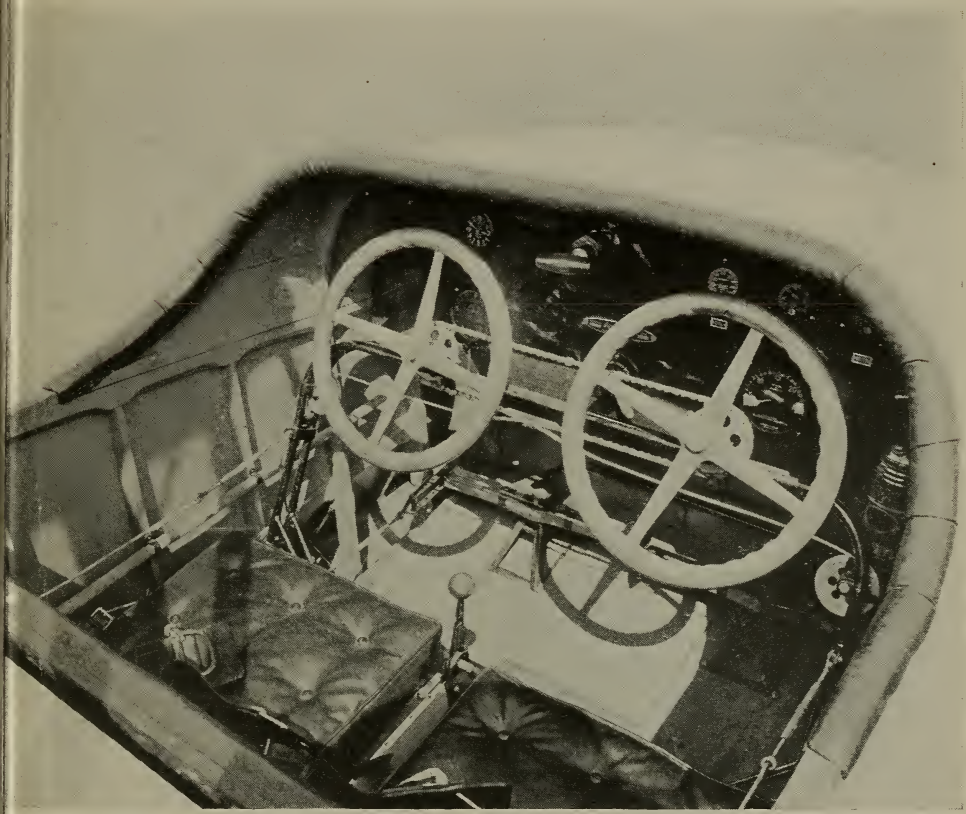


Fig. 5.—Main Cockpit.

INTERPLANE CABLES.

Location.	Type.	Inner.	Outer.	Overhang.
Front	Flying	Double $\frac{3}{16}$ Strand	Double $\frac{5}{32}$ Strand	Double $\frac{5}{32}$ Strand
	Landing	Single $\frac{3}{16}$ Strand	Single $\frac{5}{32}$ Strand	
Rear	Flying	Double $\frac{5}{32}$ Strand	Double $\frac{5}{32}$ Strand	Double $\frac{5}{32}$ Strand
	Landing	Single $\frac{3}{16}$ Strand	Single $\frac{3}{16}$ Strand	
Stagger	Upper Front to Lower Rear	Single $\frac{1}{8}$ Strand	Single $\frac{1}{8}$ Strand	
	Lower Front to Upper Rear	Single $\frac{1}{8}$ Strand	Single $\frac{1}{8}$ Strand	

INSTRUCTIONS FOR ASSEMBLY.

METHOD OF SHIPMENT.

A complete boat, including the engines, is packed in four (4) separate boxes.

Box No. 1 contains the hull, wing floats, engine bed struts and other parts.

Box No. 2 contains the wing panels, struts, and tail units.

Box No. 3 contains the engine.

Box No. 4 contains the radiator.

NOTE.—Detailed packing lists are enclosed in each box. (See Pages 24 to 27 inclusive.)

HANDLING BOXES.

In handling and hoisting these shipping boxes, care should be taken when using the sling or bridle that the center of lift comes as near the center of gravity of the box as possible. The boxes containing the panels and motors are readily handled with ordinary tackle. The bridle can be quickly adjusted for the panel boxes, so that the box rides on an even keel. Attachment straps are provided for handling the hull box. Even though the hull and other contents are kept in a fixed position in the box by braces, the part of the box marked "Top" should be uppermost. In this position the hull rests unstrained on the box bracings. The following schedule indicates the approximate weights of the various boxes shipped:

	Pounds.
( ) Hull Box	4500
( ) Panel Box	2000
) Motor Box	680
) Radiator Box	90

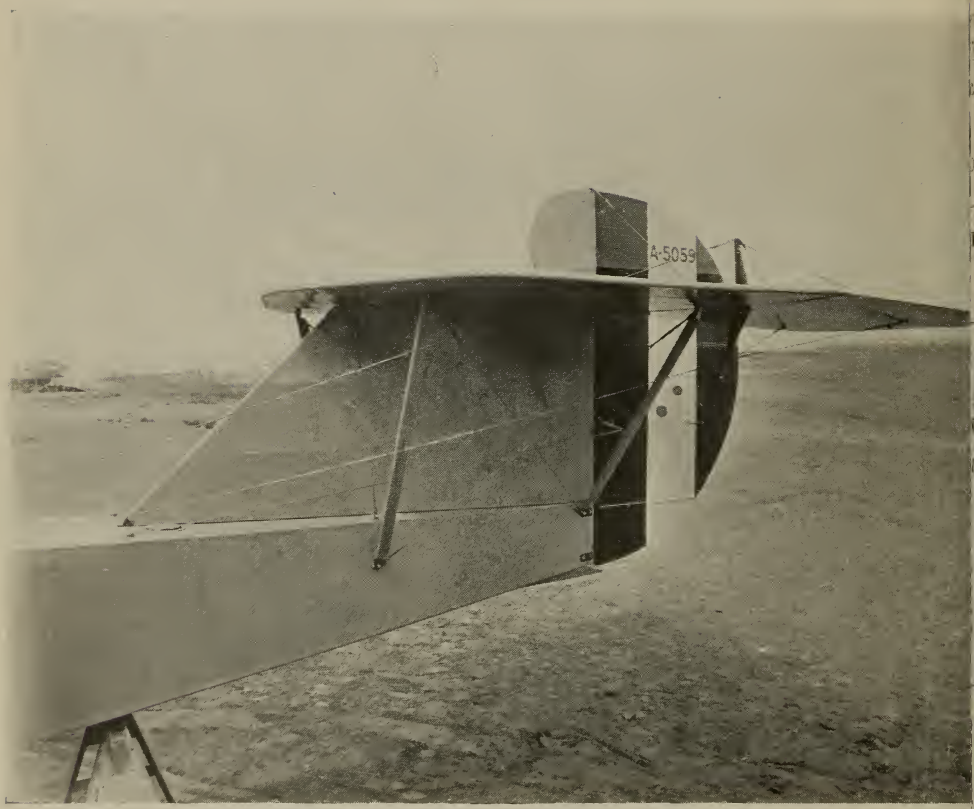


Fig. 7.—Tail Assembly.

Before opening the panel boxes means should be provided for supporting the panels in cradles or on horses or on soft felt pads. The panels may be thus placed on their leading edge and supported between uprights fastened to the floor. Caution should be exercised in opening the panel boxes so that the wood is not splintered or forced into the panels. Remove all nails from the top side edges of the boxes to avoid the possibility of tearing the panels when they are removed from the boxes. The members should not be forced from the shipping cases. The side walls should be removed if there is any evidence of a tight fit. It is much safer to break the packing case than to strain a flying unit.

The following blue prints are shipped with each hull packing box:

Drawing No.	Name of Drawing	Data Given
1541	Front Elevation	General Dimensions.
1542	Side Elevation	General Dimensions.
1540	Plan View	General Overall Dimensions.
1528	Upper Panel, External	External Fittings.
12500	Lower Panel, Internal	Detail Dimensions, Hinges.
1529	Lower Panel, External	Details of Fittings.
12528	Upper Panel, Internal	Panel Details, Dimensions, Hinges.
1530	Wing Wiring Diagram	Location of Landing and Flying Wires.
1526	Tail Assembly	General Arrangement.
6134	Hull Drawing	Details of Hull Dimensions, etc.
6234	Hull Drawing	Details of Control Wiring and Instruments.
3006	Control System	Details of Controls.
8134	Engine Section Drawings	Details of Engine Installation.
6580	Motor Controls	General Arrangement.

UNPACKING HULL BOX NO. 1.

1. Remove top and the right side as marked on box, also nose and tail braces inside of box.

2. Remove small parts from the box.

3. A chain block of 1000 pounds' capacity or over should be used in lifting hull from box.

4. Do not attempt to remove the interior bracing of the hull box before the tackle is secured to the hull. Do not attempt to slide the hull along the fin edge stringers either before or after the tackle is in place.

5. The tackle should be so adjusted that the hull will lift evenly.

6. After lifting boat free from cradle either move box free from under hull or swing boat free from box and lower into cradle.

NOTE.—When hull and parts are first removed from boxes they should be carefully inspected to see that no damage has occurred during shipment.

UNPACKING BOX NO. 2.

1. Carefully remove top and such bracing as to allow removal of panels, struts, etc.

UNPACKING BOX NO. 3.

1. Follow instructions printed on box.

UNPACKING BOX NO. 4.

1. Remove top and take out radiator.

ASSEMBLY OF ENGINE SECTION.

1. Select a comparatively straight level spot and level up boat fore and aft and athwartships. This can be done by using a jig which takes into consideration the angle of incidence of two (2) degrees.

2. Level the boat across the mid section by straight edge and level set on front and rear beams respectively. The boat can be leveled by jacking up cradle at corners. If the boat is moved in one direction it should be checked to see that it is still level in any other direction. After checking boat see that the sidewalk beams are level laterally. This should be correct unless beams have been damaged in transit.

3. Attach the lower engine section struts and wood motor bearers and level up engine bed by means of the diagonal wires. These wires should be fairly long and can be used to make slight adjustments in engine bed levels.

4. Lift engine into place by means of a chain block or other suitable tackle.

5. Engine beds should be level fore and aft and athwartships when boat is level.

6. Attach gravity gasoline tank.

7. Connect up piping and wiring to engine.

8. Attach upper engine section struts and engine section panel.

9. Check up level of engine section laterally.

10. To check for eight inch stagger drop plumb bob from leading edge of upper engine section panel. The leading edge of the upper wing should be in correct relation to the leading edge of the lower wing section of the hull.

11. Attach radiator and connect piping.

ASSEMBLY OF TAIL SURFACES.

12. The tail surfaces can be assembled at any time while the wings are being assembled.

(*a*) Put fin in place and check up vertically. Fin should be exactly vertical when boat is level.

(*b*) Set stabilizer in place over fin and fasten with bolts.

(*c*) Attach steel stabilizer braces to hull and set stay wires.

(*d*) Attach rudder and elevator at hinge points. Stay wires from horns on rudder and elevators to their respective trailing edges may be used to take out any warp in the trailing edges. Control wires on elevators should be so adjusted that the elevators are level when the control bridge is in neutral position. The control wires should be slightly slack when in neutral position, in order not to bind when in extreme positions. Control wires on rudder should be fairly taut, but must not cause binding on rudder pins.

ASSEMBLY OF WING PANELS.

13. (*a*) Stand complete upper and lower wings on edge parallel to each other with leading edges on the ground. Connect wings with struts and interplane wires. The system of numbering the struts is shown in Figure 10.

(*b*) Tighten wires to approximately flying position, giving approximately eight inch stagger. Care should be taken that flying wires to panel overhang are not too taut.

(*c*) Attach steel tube pylons and pylon brace wires.

(*d*) Attach ailerons at hinge points and block to keep them from moving while the panels are attached to boat.

(*e*) Lift panels completely assembled into place and attach at hinge points, holding in position until landing wires are made fast. About five men are necessary to properly handle the assembled wing.

(*f*) Connect up all wing control wires. (See fig. 14.)

(*g*) Adjust interplane wires. In making this adjustment, landing wires should be used to get proper alignment before adjusting flying wires. After landing wires have been brought to an approximately correct tension, flying wires should be made taut but slightly less so than landing wires. Tightening flying wires may throw wings out of alignment so landing wires should again be checked and adjusted, if necessary. Care should be taken that landing wires do not have too much tension.

(*h*) Make adjustment of stagger wires, giving both wires approximately the same tension.

(*i*) Make preliminary checking of alignment by eye to see if upper leading edge is parallel to lower leading edge.

(*j*) Check for eight inch stagger by dropping plumb bob from upper leading edge.

(*k*) The angle of incidence can be checked by using an adjustable level (see fig. 8), set to two degrees and held parallel to the webs on the lower surfaces of the lower wing. The wing chord is inclined two degrees to horizontal. This check should be taken near the outer end of wings parallel to centre line of boat. This checks for any warp in the wings.

(*l*) Check for dihedral by using a long straight edge parallel to wing beams with the level tube set at two degrees, or by making a level board with the required angle of two degrees and using a

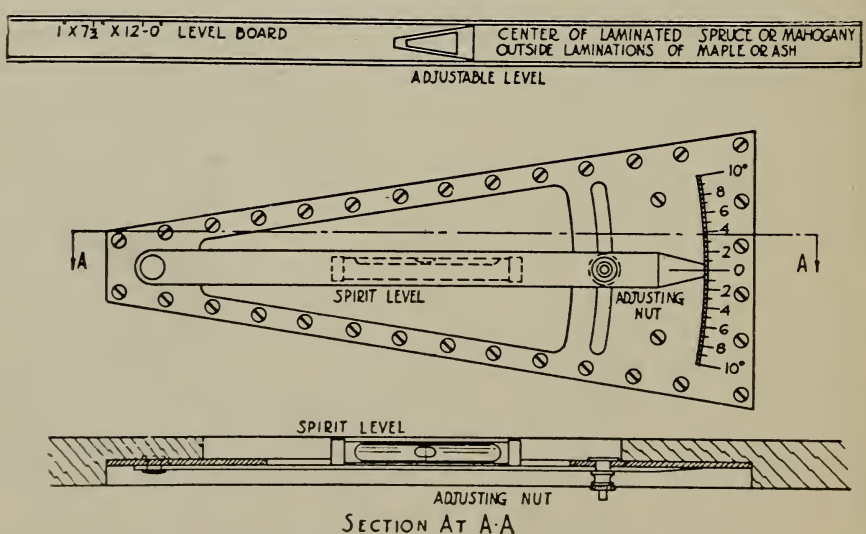


Fig. 8.—Adjustable Level.

spirit level on top edge. This gives an upward slope of the wings of two degrees, if the top edge of the board is level, or the method shown in figure 12 could be used, being the simplest method and sufficiently accurate.

(*m*) See that aileron control wires leading to horns are given the same tension.

14. Attach wing tip pontoons and set wires taut.

15. Check length of drift wires from nose of boat to upper wings to see that the wires are equal in length and have the same tension. (This squares the wings with the axis of the hull.)

16. (*a*) Make general inspection of all wires, clevises, cotter pins, turnbuckles, pipe lines, wiring, controls, and all connections of any kind to see that they are taut and in proper place and shape.

(*b*) Put safety wires on all turnbuckles after final adjustment. Turnbuckles should not show more than three threads outside of barrel, or less than ¾ inch of shank when finally adjusted.

17. Attach propeller and any accessories.

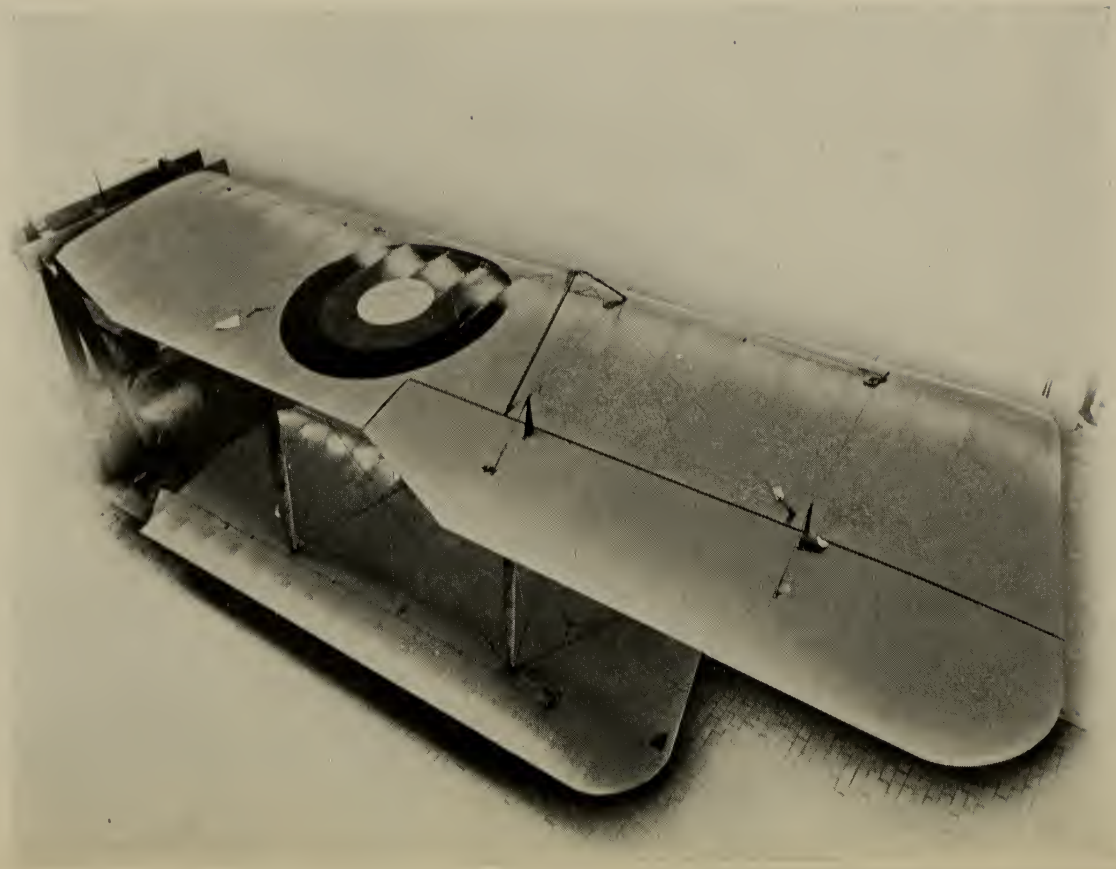


TABLE No. I.—*Specific gravity equivalents for degrees Baumé for liquids lighter than water.*

Formula: Degrees Baumé $= \frac{140}{\text{Sp. gr.}\ \frac{60°}{60°}\ \text{F.}} = 130$

[Sp. gr. taken at 60° F. and referred to distilled water at 60° F.]

Baumé.	Specific gravity.	Pounds per gallon.	Baumé.	Specific gravity.	Pounds per gallon.	Baumé.	Specific gravity.	Pounds per gallon.
10	1.0000	8.33	37	0.8383	6.98	64	0.7217	6.01
11	.9929	8.27	38	.8333	6.94	65	.7179	5.98
12	.9859	8.21	39	.8285	6.90	66	.7143	5.95
13	.9790	8.16	40	.8235	6.86	67	.7107	5.92
14	.9722	8.10	41	.8187	6.82	68	.7071	5.89
15	.9655	8.04	42	.8139	6.78	69	.7035	5.86
16	.9589	7.99	43	.8092	6.74	70	.7000	5.83
17	.9524	7.93	44	.8046	6.70	71	.6965	5.80
18	.9459	7.88	45	.8000	6.66	72	.6931	5.78
19	.9396	7.83	46	.7955	6.63	73	.6897	5.75
20	.9333	7.78	47	.7909	6.59	74	.6863	5.72
21	.9272	7.72	48	.7865	6.55	75	.6829	5.69
22	.9211	7.67	49	.7821	6.52	76	.6796	5.66
23	.9150	7.62	50	.7777	6.48	77	.6763	5.63
24	.9091	7.57	51	.7735	6.44	78	.6730	5.60
25	.9032	7.53	52	.7692	6.41	79	.6698	5.58
26	.8974	7.48	53	.7650	6.37	80	.6666	5.55
27	.8917	7.43	54	.7609	6.34	81	.6635	5.52
28	.8861	7.38	55	.7568	6.30	82	.6604	5.50
29	.8805	7.34	56	.7527	6.27	83	.6573	5.48
30	.8750	7.29	57	.7487	6.24	84	.6542	5.45
31	.8696	7.24	58	.7447	6.20	85	.6511	5.42
32	.8642	7.20	59	.7407	6.17	86	.6481	5.40
33	.8589	7.15	60	.7368	6.14	87	.6451	5.38
34	.8537	7.11	61	.7329	6.11	88	.6422	5.36
35	.8485	7.07	62	.7292	6.07	89	.6392	5.33
36	.8433	7.03	63	.7254	6.04	90	.6363	5.30

TABLE NO. II.—*Metric conversion table.*

[English to metric.]

English units.	Hundredths of an inch to millimeters.	Feet to meters.	Miles to kilometers.	Gallons to liters.	Pounds to kilograms.
1	0.254	0.30480	1.6093	3.7853	0.45359
2	.508	.60960	3.2187	7.5707	.90718
3	.762	.91440	4.8280	11.3560	1.36078
4	1.016	1.21920	6.4374	15.1413	1.81437
5	1.270	1.52400	8.0467	18.9267	2.26796
6	1.524	1.82880	9.6561	22.7120	2.72155
7	1.778	2.13360	11.2654	26.4973	3.17515
8	2.032	2.43840	12.8748	30.2827	3.62874
9	2.286	2.74321	14.4841	34.0680	4.08233
10	2.540	3.04801	16.0935	37.8533	4.53592
11	2.794	3.35281	17.7028	41.6387	4.98552
12	3.048	3.65761	19.3122	45.4240	5.44311
13	3.302	3.96241	20.9215	49.2093	5.89670
14	3.556	4.26721	22.5309	52.9947	6.35029
15	3.810	4.57201	24.1402	56.7800	6.80389
16	4.064	4.87681	25.7496	60.5653	7.25748
17	4.318	5.18161	27.3589	64.3506	7.71107
18	4.572	5.48641	28.9682	68.1360	8.16466
19	4.826	5.79121	30.5776	71.9213	8.61826
20	5.080	6.09601	32.1869	75.7066	9.07185
21	5.334	6.40081	33.7963	79.4920	9.52544
22	5.588	6.70561	35.4056	83.2773	9.97903
23	5.842	7.01041	37.0150	87.0626	10.43263
24	6.096	7.31521	38.6243	90.8480	10.88622
25	6.350	7.62002	40.2337	94.6333	11.33981
26	6.604	7.92482	41.8430	98.4186	11.79340
27	6.858	8.22962	43.4524	102.2040	12.24700
28	7.112	8.53442	45.0617	105.9893	12.70059
29	7.366	8.83922	46.6711	109.7746	13.15418
30	7.620	9.14402	48.2804	113.5600	13.60777
31	7.874	9.44882	49.8898	117.3453	14.06137
32	8.128	9.75362	51.4991	121.1306	14.51496
33	8.382	10.05842	53.1085	124.9160	14.96855
34	8.636	10.36322	54.7178	128.7013	15.42214
35	8.890	10.66802	56.3272	132.4866	15.87573
36	9.144	10.97282	57.9365	136.2720	16.32933
37	9.398	11.27762	59.5458	140.0573	16.78292
38	9.652	11.58242	61.1552	143.8426	17.23651
39	9.906	11.88722	62.7645	147.6280	17.69010
40	10.160	12.19202	64.3739	151.4133	18.14370
41	10.414	12.49682	65.9832	155.1986	18.59729
42	10.668	12.80163	67.5926	158.9840	19.05088
43	10.922	13.10643	69.2019	162.7693	19.50447
44	11.176	13.41123	70.8113	166.5546	19.95807
45	11.430	13.71603	72.4206	170.3400	20.41166
46	11.684	14.02083	74.0300	174.1253	20.86525
47	11.938	14.32563	75.6393	177.9106	21.31880
48	12.192	14.63043	77.2487	181.6960	21.77244
49	12.446	14.93523	78.8580	185.4813	22.22603
50	12.700	15.24003	80.4674	189.2666	22.67962
100	25.400	30.48006	160.9347	378.5330	45.35924

TABLE NO. III.—*Metric conversion table.*

[Metric to English.]

Metric units.	Millimeters to inches.	Meters to feet.	Kilometers to miles.	Liters to gallons.	Kilograms to pounds.
1	0.03937	3.28083	0.62137	0.26418	2.2046
2	.07874	6.56167	1.24274	.52836	4.4092
3	.11811	9.84250	1.86411	.79253	6.6139
4	.15748	13.12333	2.48548	1.05671	8.8185
5	.19685	16.40417	3.10685	1.32089	11.0231
6	.23622	19.68500	3.72822	1.58507	13.2277
7	.27559	22.96583	4.34959	1.84924	15.4324
8	.31496	26.24667	4.97096	2.11342	17.6370
9	.35433	29.52750	5.59233	2.37760	19.8416
10	.39370	32.80833	6.21370	2.64178	22.0462
11	.43307	36.08917	6.83507	2.90595	24.2508
12	.47244	39.37000	7.45644	3.17013	26.4555
13	.51181	42.65083	8.07781	3.43431	28.6601
14	.55118	45.93167	8.69918	3.69849	30.8647
15	.59055	49.21250	9.32055	3.96266	33.0693
16	.62992	52.49333	9.94192	4.22684	35.2740
17	.66929	55.77417	10.56329	4.49102	37.4786
18	.70866	59.05500	11.18466	4.75520	39.6832
19	.74803	62.33583	11.80603	5.01937	41.8878
20	.78740	65.61667	12.42740	5.28355	44.0924
21	.82677	68.89750	13.04877	5.54773	46.2971
22	.86614	72.17833	13.67014	5.81191	48.5017
23	.90551	75.45917	14.29151	6.07608	50.7063
24	.94488	78.74000	14.91288	6.34026	52.9109
25	.98425	82.02083	15.53425	6.60444	55.1156
26	1.02362	85.30167	16.15562	6.86862	57.3202
27	1.06299	88.58250	16.77699	7.13280	59.5248
28	1.10236	91.86333	17.39836	7.39697	61.7294
29	1.14173	95.14417	18.01973	7.66115	63.9340
30	1.18110	98.42500	18.64110	7.92533	66.1387
31	1.22047	101.70583	19.26247	8.18951	68.3433
32	1.25984	104.98667	19.88384	8.45368	70.5479
33	1.29921	108.26750	20.50521	8.71786	72.7525
34	1.33858	111.54833	21.12658	8.98204	74.9572
35	1.37795	114.82917	21.74795	9.24622	77.1618
36	1.41732	118.11000	22.36932	9.51039	79.3664
37	1.45669	121.39083	22.99069	9.77457	81.5710
38	1.49606	124.67167	23.61206	10.03875	83.7756
39	1.53543	127.95250	24.23343	10.30293	85.9803
40	1.57480	131.23330	24.85480	10.56710	88.1849
41	1.61417	134.51417	25.47617	10.83128	90.3895
42	1.65354	137.79500	26.09754	11.09546	92.5941
43	1.69291	141.07583	26.71891	11.35694	94.7988
44	1.73228	144.35667	27.34028	11.62381	97.0034
45	1.77165	147.63750	27.96165	11.88799	99.2080
46	1.81102	150.91833	28.58302	12.15217	101.4126
47	1.85039	154.19917	29.20439	12.41635	103.6173
48	1.88976	157.48000	29.82576	12.68052	105.8219
49	1.92913	160.76083	30.44713	12.94470	103.0265
50	1.96850	164.04167	31.06850	13.20888	110.2311
100	3.93700	328.08334	62.13700	26.41776	220.4622

TABLE NO. IV.—*Variation of wind velocity with altitude during the day.*

Elevation.	Velocities in miles per hour.				
Surface	5	10	15	20	25
500 feet	7	15	21	28	35
1,000 feet	8	18	26	34	43
2,000 feet	8	18	28	37	47
3,000 feet	8	18	29	40	49
4,000 feet	10	19	29	40	50
5,000 feet	13	20	29	40	50

TABLE NO. V.—*Variation of direction of wind and altitude.*

[Upper-region winds vary in direction from those near the earth's surface. The amount of deviation is given approximately in the tabulation.]

Elevation.	Deviation to right in degrees.	Directions.			
Surface	0	N	E	S	W.
500 feet	5	N. ½ E	E. ½ S	S. ½ W	W. ½ N.
1,000 feet	10	N. by E	E. by S	S. by W	W. by N.
2,000 feet	16	N. by E. ½ E	E. by S. ½ S	S. by W. ½ W.	W. by N. ½ N
3,000 feet	19	N. by E. ¾ E	E. by S. ¾ S	S. by W. ¾ W.	W. by N. ¾ N.
4,000 feet	20	NNE	ESE	SSW	WNW.
5,000 feet	21	NNE	ESE	SSW	WNW.

TABLE NO. VI.—*Compass points and their equivalents.*

° ′	*Points.*	° ′	*Points.*	° ′	*Points.*	° ′	*Points.*
0 00	N	90 00	E	180 00	S	270 00	W
2 49	N ¼ E	92 49	E ¼ S	182 49	S ¼ W	272 49	W ¼ N
5 38	N ½ E	95 38	E ½ S	185 38	S ½ W	275 38	W ½ N
8 26	N ¾ E	98 26	E ¾ S	188 26	S ¾ W	278 26	W ¾ N
11 15	N by E	101 15	E by S	191 15	S by W	281 15	W by N
14 04	N by E ¼ E	104 04	ESE ¾ E	194 04	S by W ¼ W	284 04	WNW ¾ W
16 53	N by E ½ E	106 53	ESE ½ E	196 53	S by W ½ W	286 53	WNW ½ W
19 41	N by E ¾ E	109 41	ESE ¼ E	199 41	S by W ¾ W	289 41	WNW ¼ W
22 30	NNE	112 30	ESE	202 30	SSW	292 30	WNW
25 19	NNE ¼ E	115 19	SE by E ¾ E	205 19	SSW ¼ W	295 19	NW by W ¾ W
28 08	NNE ½ E	118 08	SE by E ½ E	208 08	SSW ½ W	298 08	NW by W ½ W
30 56	NNE ¾ E	120 56	SE by E ¼ E	210 56	SSW ¾ W	300 56	NW by W ¼ W
33 45	NE by N	123 45	SE by E	213 45	SW by S	303 45	NW by W
36 34	NE ¾ N	126 34	SE ¾ E	216 34	SW ¾ S	306 34	NW ¾ W
39 23	NE ½ N	129 23	SE ½ E	219 23	SW ½ S	309 23	NW ½ W
42 11	NE ¼ N	132 11	SE ¼ E	222 11	SW ¼ S	312 11	NW ¼ W
45 00	NE	135 00	SE	225 00	SW	315 00	NW
47 49	NE ¼ E	137 49	SE ¼ S	227 49	SW ¼ W	317 49	NW ¼ N
50 38	NE ½ E	140 38	SE ½ S	230 38	SW ½ W	320 38	NW ½ N
53 26	NE ¾ E	143 26	SE ¾ S	233 26	SW ¾ W	323 26	NW ¾ N
56 15	NE by E	146 15	SE by S	236 15	SW by W	326 15	NW by N
59 04	NE by E ¼ E	149 04	SSE ¾ E	239 04	SW by W ¼ W	329 04	NNW ¾ W
61 53	NE by E ½ E	151 53	SSE ½ E	241 53	SW by W ½ W	331 53	NNW ½ W
64 41	NE by E ¾ E	154 41	SSE ¼ E	244 41	SW by W ¾ W	334 41	NNW ¼ W
67 30	ENE	157 30	SSE	247 30	WSW	337 30	NNW
70 19	ENE ¼ E	160 19	S by E ¾ E	250 19	WSW ¼ W	340 19	N by W ¾ W
73 08	ENE ½ E	163 08	S by E ½ E	253 08	WSW ½ W	343 08	N by W ½ W
75 56	ENE ¾ E	165 56	S by E ¼ E	255 56	WSW ¾ W	345 56	N by W ¼ W
78 45	E by N	168 45	S by E	258 45	W by S	348 45	N by W
81 34	E ¾ N	171 34	S ¾ E	261 34	W ¾ S	351 34	N ¾ W
84 23	E ½ N	174 23	S ½ E	264 23	W ½ S	354 23	N ½ W
87 11	E ¼ N	177 11	S ¼ E	267 11	W ¼ S	357 11	N ¼ W

TABLE VII.—*Equivalent value in degrees of each fractional division of the compass to the nearest minute of arc.*

	°	′
⅛ point equals	1	24
¼ point equals	2	49
⅜ point equals	4	13
½ point equals	5	38
⅝ point equals	7	02
¾ point equals	8	26
⅞ point equals	9	51

PACKING LIST FOR MODEL 40 FLYING BOAT

AEROMARINE PLANE & MOTOR CORPORATION

KEYPORT, - NEW JERSEY

Bill of lading No._____ Manufacturers No._____

Wing Set No._____

Box No. 1		Hull Box and Fittings
1		Boat hull No. ....., including th following:
	2	Bolt, nuts and cotters in fittings for vertical stabilizer.
	2	Seats with cushions.
	2	Rudder control wires with t/b.
	4	Elevator control wires.
	2	Aileron control wires.
	2	Safety belts.
	1	Bilge pump.
	1	Pyrene and bracket.
	1	Aeroplane clock.
	1	Dual bridge control.
	2	Footbar rudder controls.
	2	Drift wire clips on hull side.
1		Upper engine center section of wing with:
	4	Brace wires and turnbuckles.
	4	Lifting clamps.
	4	Upper engine bed braces. Set No. .....
	8	Lower engine bed braces. Set No. .....
2		Wing tip floats complete with:
	6	Tube braces right, Set No. .....
	6	Tube braces left, Set No. .....
	2	Brace wires with T. B.
	2	Brace wires with T. B.
1		Set of blueprints and handbook for erection pu poses.
2		Engine bed bearers.

Accepted by_____U. S. N.

Checked by _____

Destination _____ Date Shipped _____

PACKING LIST FOR MODEL 40 FLYING BOAT

AEROMARINE PLANE & MOTOR CORPORATION

KEYPORT, - NEW JERSEY

Bill of lading No._____ Manufacturers No._____

Box No. 2	Name of Part
1	altimeter.
1	Tachometer shafting, 14, and speed reducer.
1	hand gasoline pump assembly.
1	oil pressure gauge and copper piping to motor.
1	oil thermometer and tube to motor.
1	water thermometer and tube to radiator.
1	magneto switch and wiring to motor.
1	inter-communicating telephone set.
1	throttle control unit.
1	gravity gasoline shut-off unit.
1	sight-feed gasoline indicator.
1	main gasoline tank assembly.
1	manometer gasoline pump assembly.
1	gravity gasoline tank unit.
1	hand starter.
1	magneto (double control) throttle.
6	motor anchor bolts, washers, nuts and cotter pins.

Accepted by .....U. S. N.

Checked by .....

Destination .....

Date Shipped .....

PACKING LIST FOR MODEL 40 FLYING BOAT

AEROMARINE PLANE & MOTOR CORPORATION

KEYPORT, - NEW JERSEY

Bill of lading No._____ Manufacturers No._____

Wing Set No._____

Box No. 2		Name of Part
1		Right upper wing including:
	2	Hinge pins in hinges.
	6	Aileron hinge pins and cotters.
	1	Aileron control cable.
	4	Post sockets.
	18	Interplane cables including overhang cables, with bolts, nuts and cotters attached.
	1	Hull to upper wing drift wire with bolts and cotters.
1		Right lower panel with post sockets and
	2	Hinge pins in hinges.
	4	Pontoon brace clips attached to under side.
1		Left lower panel, including:
	2	Hinge pins in hinges.
	2	Interplane cables.
	1	Aileron control cable.
	4	Pontoon brace clips attached to under side.
	1	Left upper wing including:
	2	Hinge pins in hinges.
	6	Aileron hinge pins and cotters.
	4	Post sockets.
	18	Interplane cables including overhang cables with bolts, nuts and cotters attached.
	1	Hull to upper wing drift wire with bolts and cotters.
		Safety wires for wing set up.
2		Overhang supporting braces (steel), including:
	4	Cables and T. B. on each.
2		Ailerons with 2 brace wires to horns.
1		Rudder complete with:
	2	Brace wires.
	5	Hinge pins with cotters in hinges.
2		Elevators complete with:
	4	Brace wires attached to each.

PACKING LIST FOR MODEL 40 FLYING BOAT

AEROMARINE PLANE & MOTOR CORPORATION

KEYPORT, - NEW JERSEY

Bill of lading No._____ Manufacturers No._____

Wing Set No._____

Box No. 2	Name of Part
1	Vertical stabilizer complete with:
2	Brace wires and turnbuckles.
4	Rudder hinge pins.
4	Aileron horns with bolts, nuts and cotters.
6	Horns for tail units with bolts, nuts and cotters.
1	Horizontal stabilizer complete with:
4	Bolts, nuts and cotters in brace clips.
8	Hinge pins with cotters in hinges.
1	Right upper brace wire to fin.
1	Left upper brace wire to fin.
8	Wing struts with end fittings.
4	Stabilizer braces.
4	Horizontal stabilizer brace wires.

Accepted by .....U. S. N.

Checked by .....

Destination .....

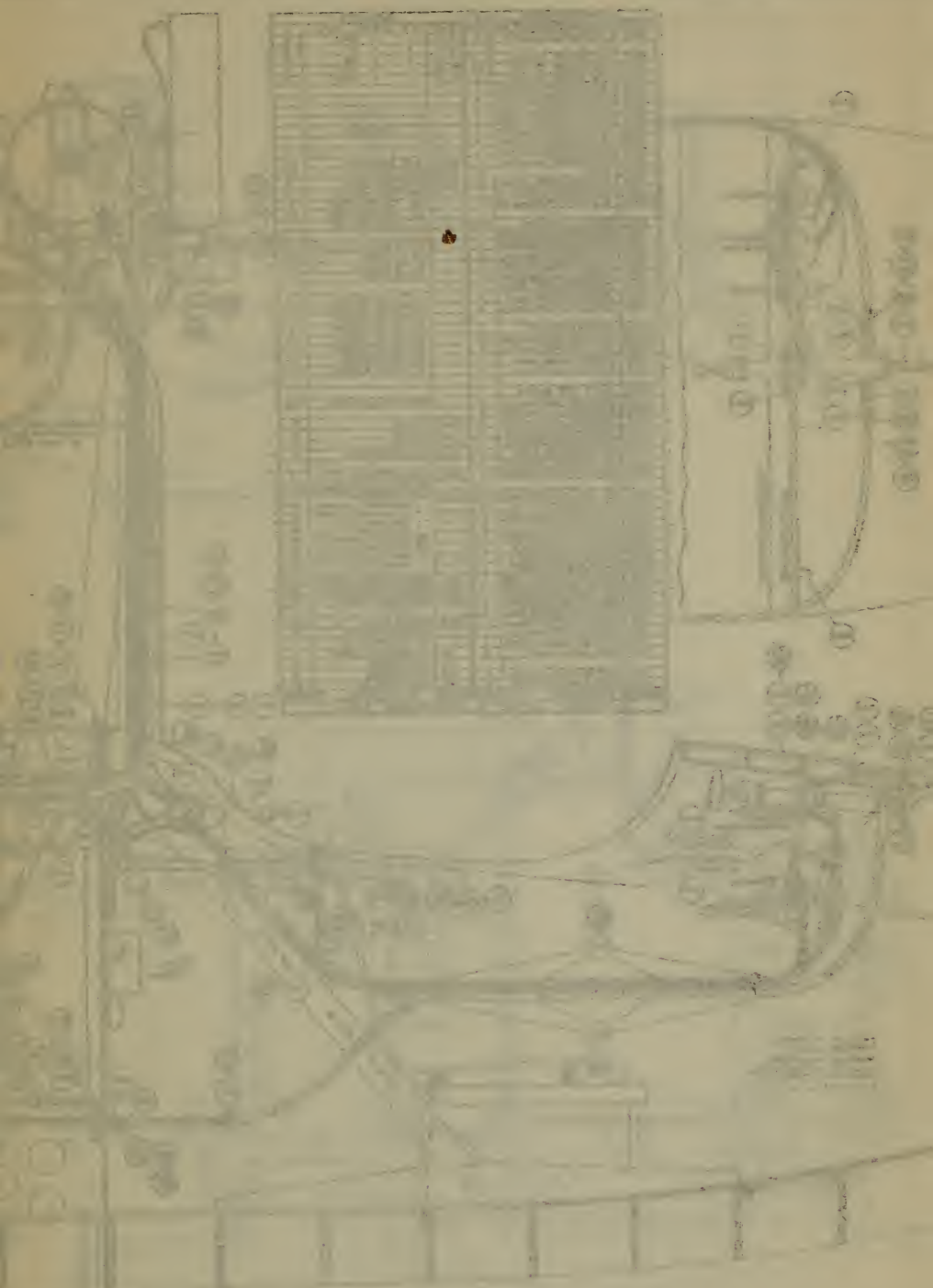
Date Shipped .....

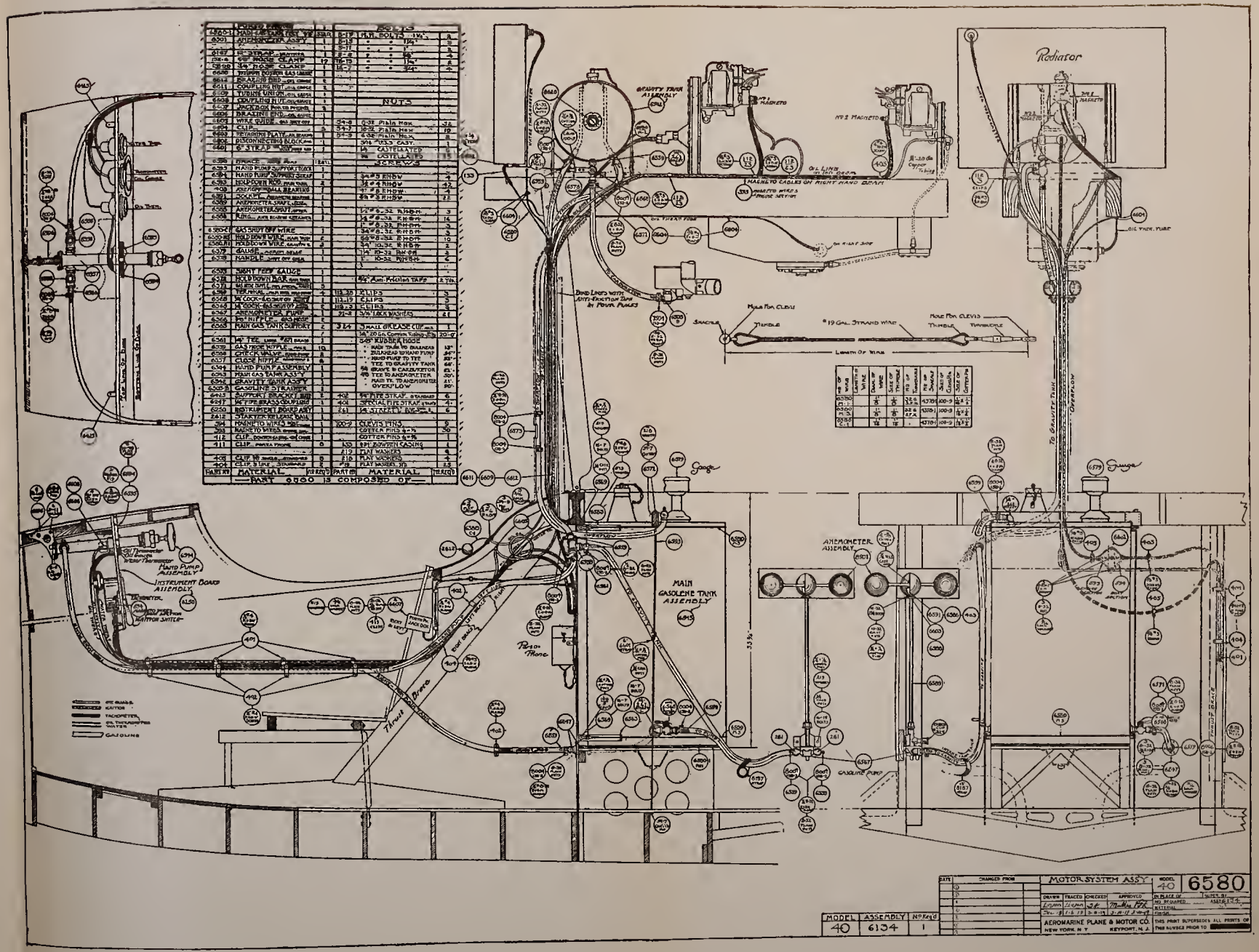
MEMORANDA.

MEMORANDA.

MEMORANDA.

FIG. 6.—MOTOR CONTROLS.





PART NO.	MATERIAL	REQ'D
	PART 6900 IS COMPOSED OF	
6900-1	HAND PUMP SUPPORT STRAP	1
6901	ANEMOMETER ASSY.	1
6902	" " "	1
6907	U-STRAP	1
6908-A	1/8" HOSE CLAMP	17
6908	3/4" HOSE CLAMP	1
6630	TYPHON NIPPON GAS UNION	1
6610	GASOLINE END	1
6611	COUPLING NUT	1
6609	TUBING UNION	1
6608	COUPLING NUT	1
6607	ANCHOR FOR TUBING	1
6606	BRAKING END	1
6605	WIRE GUIDE	1
6604	CLIP	1
6603	RETAINING PLATE	1
6602	DISCONNECTING BLOCK	1
6601	6 STRAP	1
6599	BRACKET FOR TUBING	1
6597	HAND PUMP SUPPORT BLOCK	1
6596	HAND PUMP SUPPORT STRAP	1
6593	ADJUSTING ROD	2
6592	ADJUSTING BALL BEARING	1
6591	SOCKET	1
6589	ANEMOMETER SHAFT	1
6588	ANEMOMETER ASSY.	1
6586	RING	1
6580-C	GAS SHUT OFF WIRE	1
6580-BB	HOLD DOWN WIRE	1
6580-BA	HOLDDOWN WIRE	1
6579	GAUGE	1
6578	HANDLE	1
6577	SIGHT FEED GAUGE	1
6576	HOLD DOWN BAR	1
6575	BRACE BOLT	5
6570	TERMINAL	4
6568	3/8 COCK-GAS SHUT OFF	1
6567	1/4 COCK-GAS SHUT OFF	1
6565	ANEMOMETER PUMP	1
6564	PET NIPPLE	1
6563	MAIN GAS TANK SUPPORT	2
6561	1/4" TEE	1
6559	GAS HOSE NIPPLE	10
6558	COCK-GAS VALVE	1
6557	CLOSE NIPPLE	6
6554	HAND PUMP ASSEMBLY	1
6553	MAIN GAS TANK ASSY.	1
6545	GRAVITY TANK ASSY.	1
6505-B	GASOLINE STRAINER	1
6443	SUPPORT BRACKET	2
6437	1/4" PIPE BRASS COUPLING	2
6250	DISTRIBUTOR BOARD ASSY.	1
2612	STARTER-KEY LOCK PLATE	1
264	MAGNETO WIRES	2
258	RADIO TO WIRES	1
412	CLIP	1
411	CLIP	1
408	CLIP TO ENGINE	2
407	CLIP 3 1/2"	2

PART NO.	MATERIAL	REQ'D
	BOLTS	
B-19	FLH. BOLTS 1 1/4"	A
B-15	" " 1 1/4"	B
B-11	" " 1"	C
B-2	" " 5/8"	D
B-10	" " 1 1/4"	E
B-7	" " 3/4"	F
	NUTS	
34-9	0-32 Plain Hex.	36
34-3	10-32 Plain Hex.	18
34-9	6-32 Plain Hex.	1
	3/16 "103.5 CAST.	1
	14 CASTELLATED	15
	16 CASTELLATED	15
	SCREWS	
	3-48 FLH	2
	3-48 RHDW	42
	3-48 FHDW	4
	3-48 RHDW	11
	1-72 6-32 RHDW.	3
	1/4" 6-32 RHDW.	14
	1" 6-32 RHDW.	3
	3/4" 6-32 RHDW.	3
	6-32 FHDW.	10
	3/4" 10-32 RHDW.	2
	1/4" 10-32 RHDW.	2
	10-32 RHDW.	6
314	3 Mall GREASE CUP	1
	3/16 OD Copper Tubing	20-0
	5/8" RUBBER HOSE	
	MAIN TANK TO BALANCE	13"
	BALANCE TO HAND PUMP	24"
	HAND PUMP TO TEE	22"
	TEE TO GRAVITY TANK	66"
	TEE TO CARBURETOR	51"
	TEE TO ANEMOMETER	30"
	HAND PU. TO ANEMOMETER OVERFLOW	41"
		80"
408	1/4 PIPE STRAP STAMPED	6
408	SPECIAL PIPE STRAP (1940)	41
261	1/4 STREET ELL	6
100-9	CLEVIS PINS	9
	COTTER PINS 1/16	30
	COTTER PINS 3/32	1
435	8PL ROUTEN CASING	1
A19	FLAT WASHERS	9
B16	FLAT WASHERS	4
F18	FLAT WASHERS 3/8	13

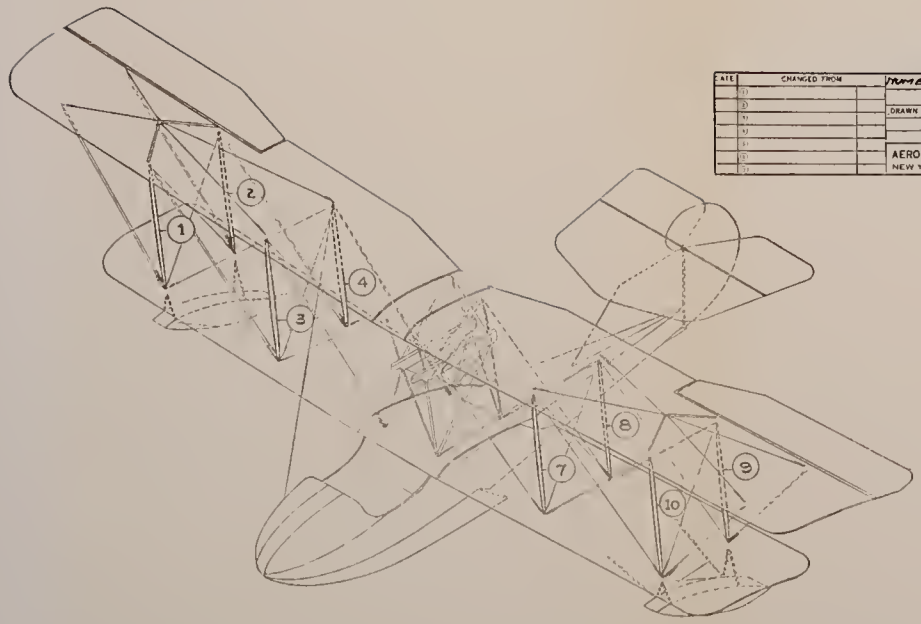
MODEL	ASSEMBLY	NO. REQ'D
40	6134	1

DATE	CHANGES FROM	MOTOR SYSTEM ASSY	MODEL 40	6580
		DRAWN / TRACED / CHECKED / APPROVED	IN PLACE OF	SUPER. BY
		1-20-41 / 1-24-41 / [illegible] / [illegible]	ENG. REQUIRED	ASSY. BY
		2-6-41 / 2-8-41 / 2-10-41 / [illegible]	MATERIAL	
			FINISH	

AEROMARINE PLANE & MOTOR CO. NEW YORK, N.Y. KEYPORT, N.J.

THIS PRINT SUPERSEDES ALL PRINTS OF THIS NUMBER PRIOR TO

FIG. 10.—SYSTEM OF NUMBERING POSTS.



DATE	CHANGED FROM	NUMBERING OF WING POSTS				MODEL	1533
		MODEL 40				IN PLACE OF	SUPER BY
		DRAWN	TRACED	CHECKED	APPROVED	NO. REQUIRED	ASSY
		H H		M Miller		MATERIAL	
		2-6-19.		6-7-19		FINISH	
		AEROMARINE PLANE & MOTOR CO. NEW YORK N Y KEYPORT, N J				THIS PRINT SUPERSEDES ALL PRINTS OF THIS NUMBER PRIOR TO [redacted]	

FIG. 11.—HULL BOX; LONGITUDINAL SECTION PLAN AND SIDE ELEVATION.

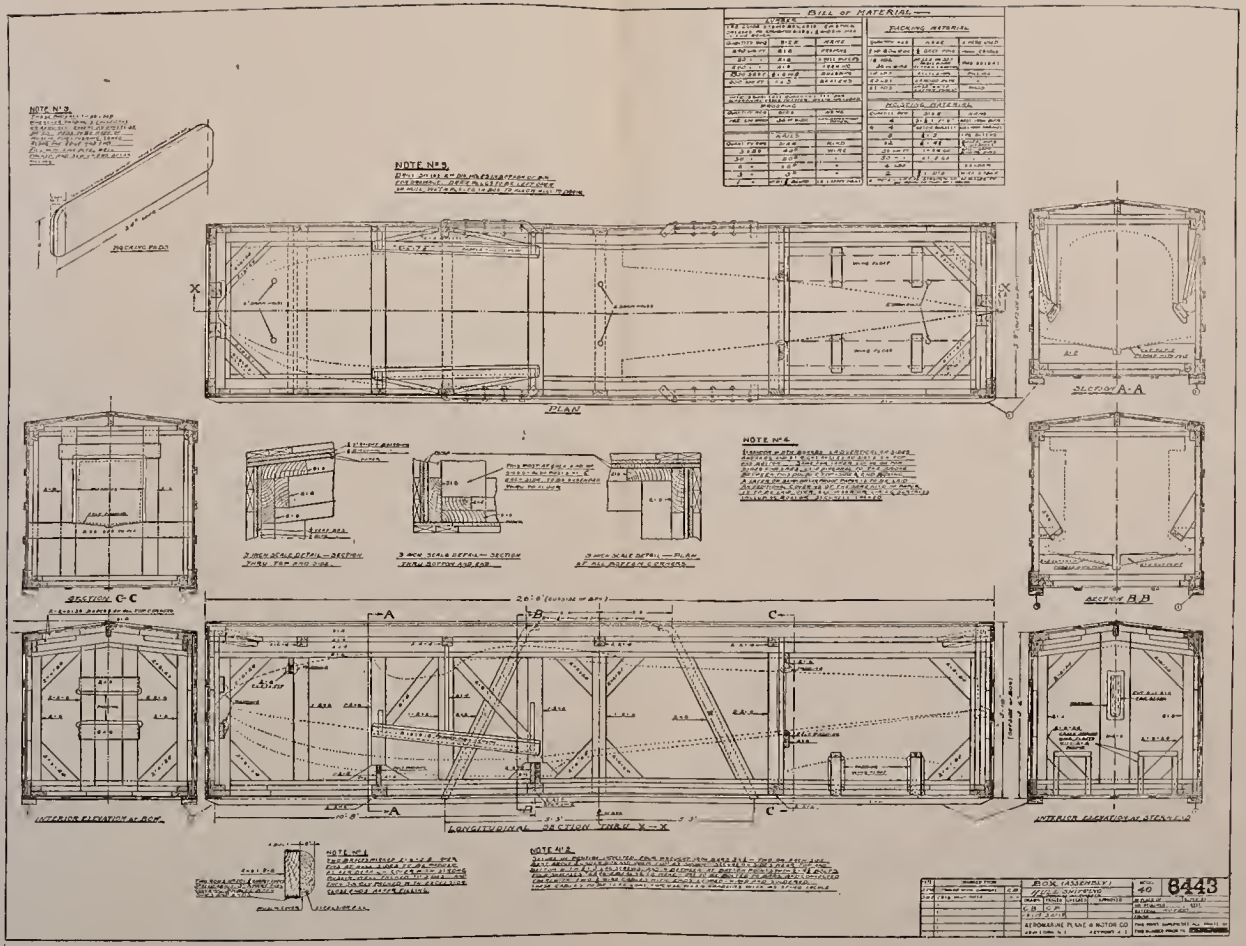

BILL OF MATERIAL
PACKING MATERIAL
NOTE No 3.
NOTE No 5.
NOTE No 6.
PACKING PAD
PLAN
SECTION A-A
SECTION B-B
SECTION C-C
3 INCH SCALE DETAIL — SECTION THRU TOP AND SIDE
3 INCH SCALE DETAIL — SECTION THRU BOTTOM AND END
3 INCH SCALE DETAIL — PLAN AT ALL POSTS & CORNERS
INTERIOR ELEVATION AT A
INTERIOR ELEVATION AT B
LONGITUDINAL SECTION THRU X—X
NOTE No 1
NOTE No 2
BOX (ASSEMBLY)
AEROMARINE PLANE & MOTOR CO
8443

FIG. 11.—HULL BOX; LONGITUDINAL SECTION PLAN AND SIDE ELEVATION.

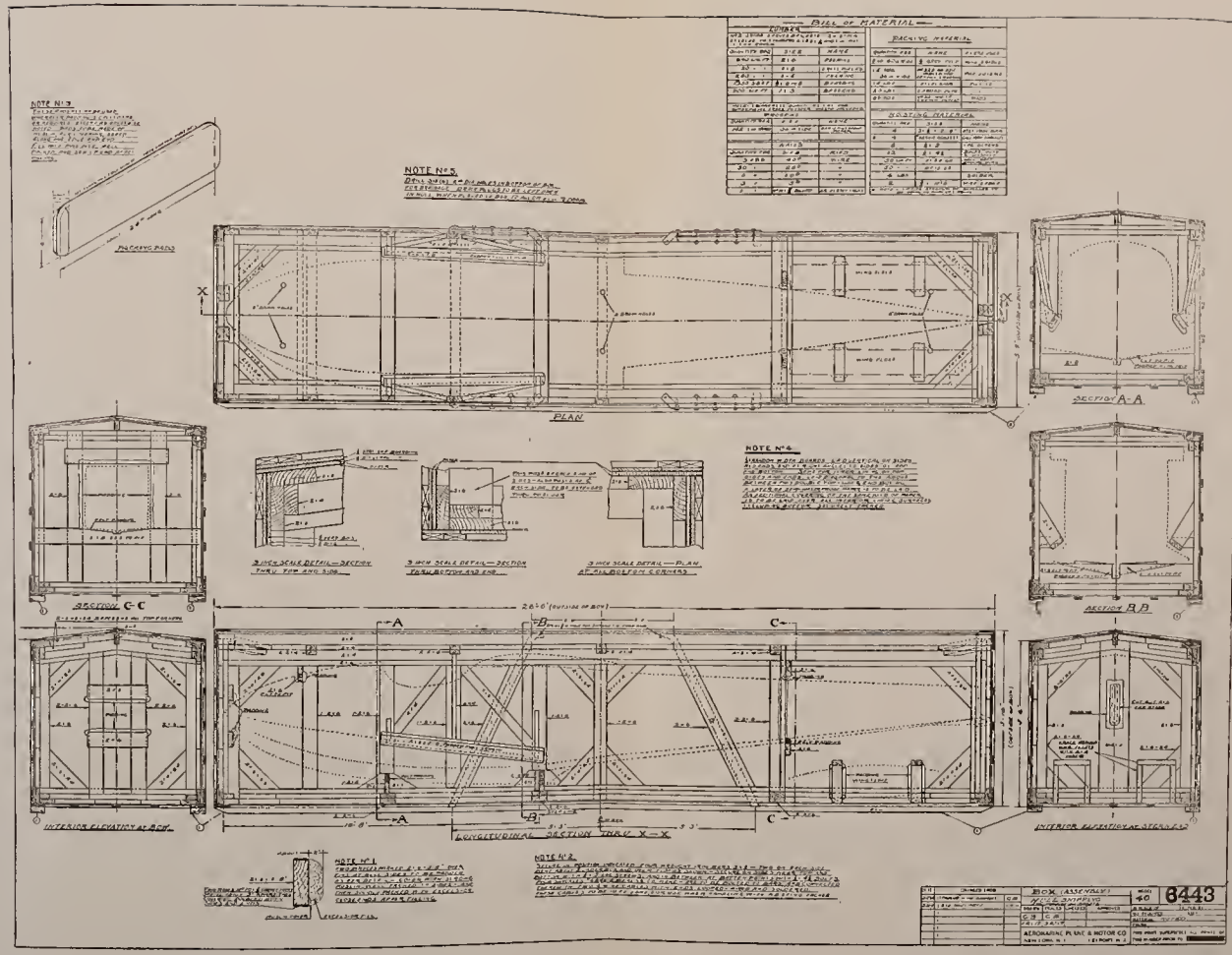
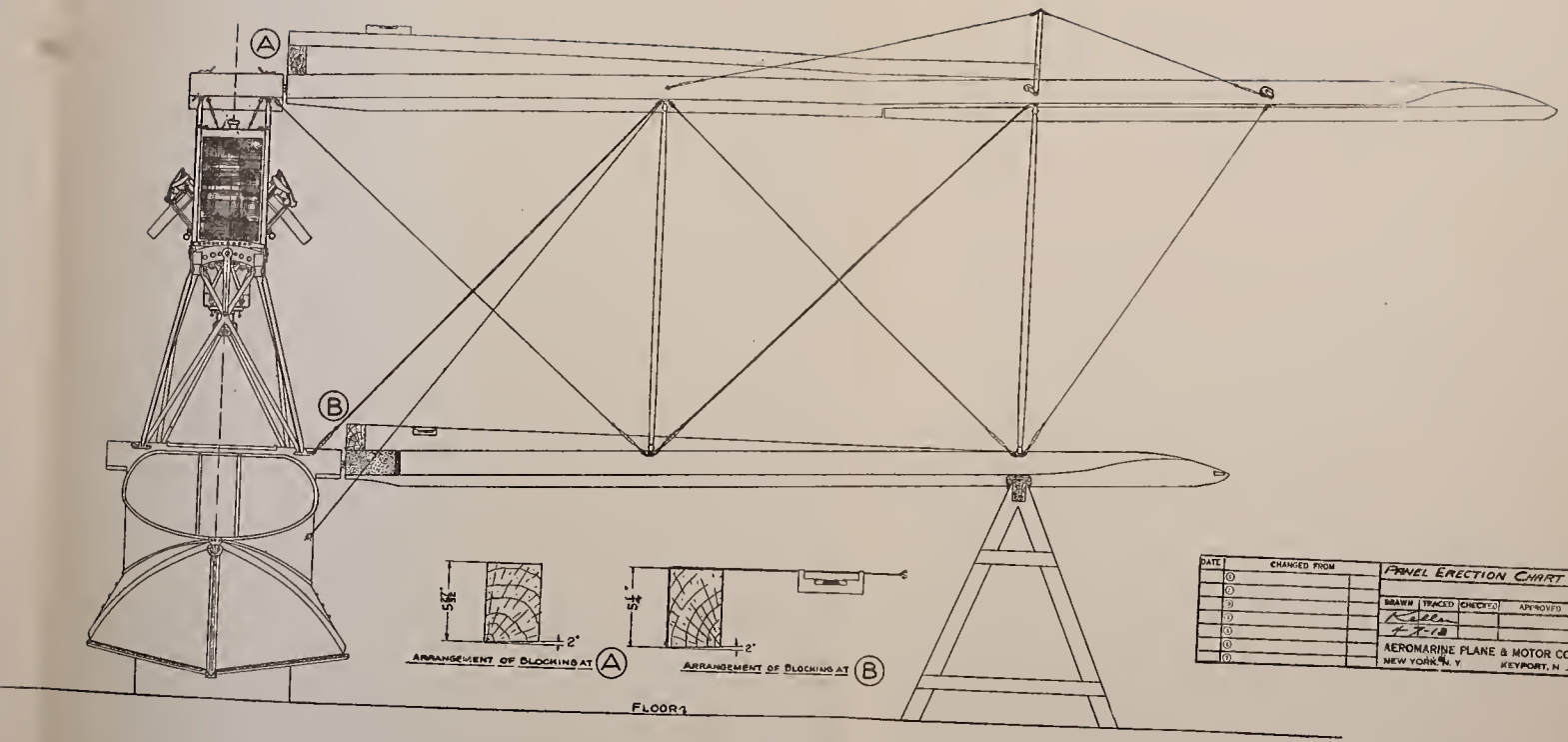

BILL OF MATERIAL
NOTE No 3
PATTERN PIECE
NOTE No 5
PLAN
SECTION A-A
SECTION C-C
SECTION B-B
3 INCH SCALE DETAIL—SECTION THRU TOP AND SIDE
3 INCH SCALE DETAIL—SECTION THRU BOTTOM AND END
3 INCH SCALE DETAIL—PLAN AT PILLAR FOR CORNERS
NOTE No 6
INTERIOR ELEVATION AT BOX
INTERIOR ELEVATION AT OPPOSITE END
LONGITUDINAL SECTION THRU X—X
NOTE No 1
NOTE No 2
BOX (ASSEMBLY)
6443

FIG. 12.—CHART OF PANEL ERECTION.



DATE	CHANGED FROM
①	
②	
③	
④	
⑤	
⑥	
⑦	

PANEL ERECTION CHART

MODEL 40

12600

DRAWN	TRACED	CHECKED	APPROVED
Kobler			
7-7-18			

IN PLACE OF | SUPER BY
NO. REQUIRED | ASST
MATERIAL
FINISH

AEROMARINE PLANE & MOTOR CO.
NEW YORK, N. Y. KEYPORT, N. J.

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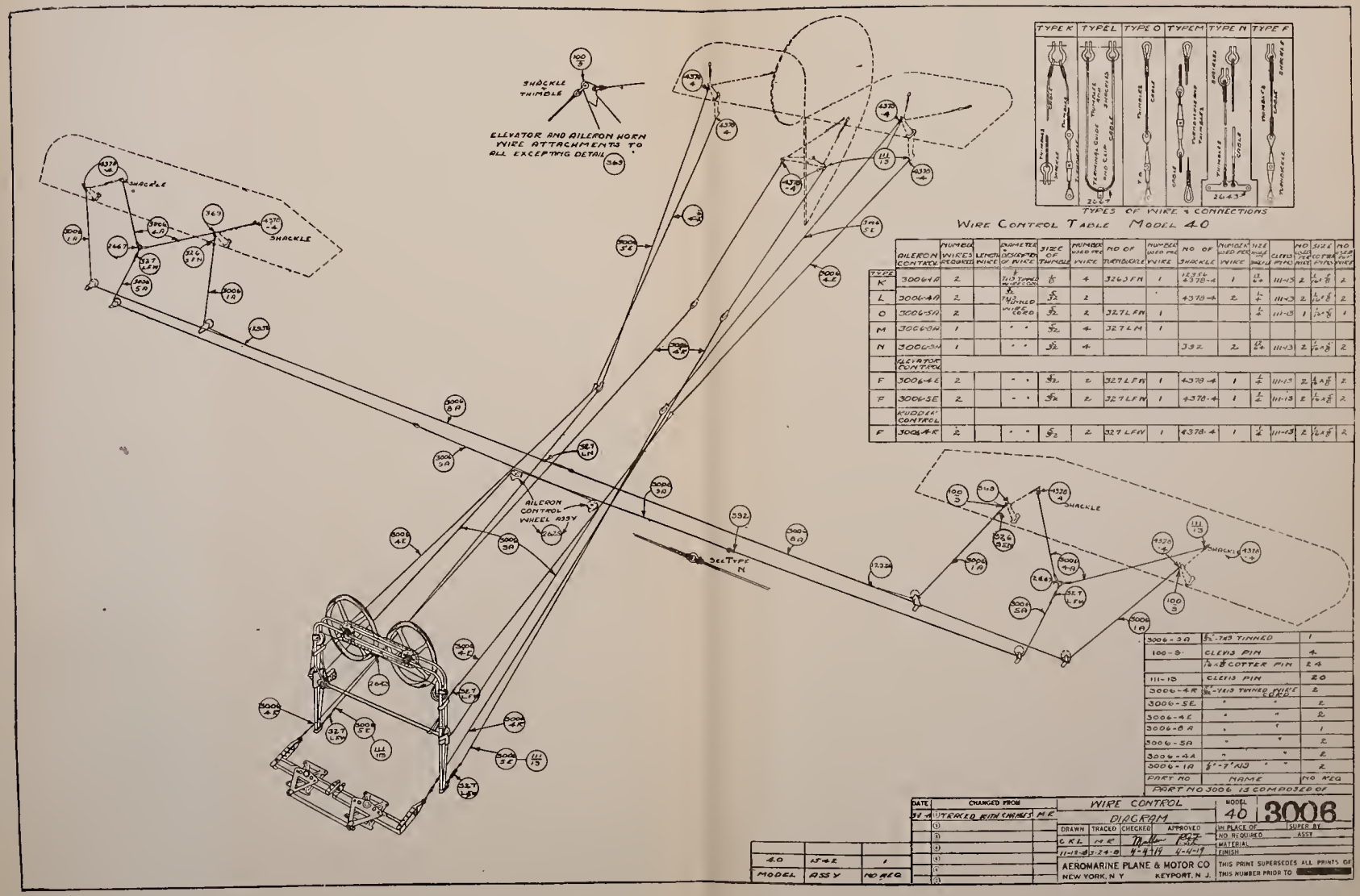
FIG. 13.—CONTROL SYSTEM.



WIRE CONTROL TABLE MODEL 40

	AILERON CONTROL	NUMBER WIRES REQUIRED	LENGTH WIRE	DIAMETER & DESCRIPTION OF WIRE	SIZE OF THIMBLE	NUMBER USED PER WIRE	NO OF THIMBLES	NO OF SHACKLE	NUMBER USED PER WIRE	NUMBER USED PER SHACKLE	SIZE CLEVIS PIN	NO USED PER WIRE	SIZE COTTER PIN	NO USED PER WIRE
TYPE														
K	3006-4K	2		7/13 TINNED AIRCRAFT CORD	5/32	4	3263FN	1	1235A 4378-4	1	1/4	2	111-13	A
L	3006-4A	2		7/13 TINNED AIRCRAFT CORD	5/32	2			4378-4	2	1/4	1	111-13	2
O	3006-5A	2		" "	5/32	2	327LFN	1			1/4	1	111-13	1
M	3006-8A	1		" "	5/32	4	327LM	1						
N	3006-3A	1		" "	5/32	4			392	2	1/4	2	111-13	2
	ELEVATOR CONTROL													
F	3006-4E	2		" "	5/32	2	327LFN	1	4378-4	1	1/4	1	111-13	2
F	3006-5E	2		" "	5/32	2	327LFN	1	4378-4	1	1/4	1	111-13	2
	RUDDER CONTROL													
F	3006-4R	2		" "	5/32	2	327LFN	1	4378-4	1	1/4	1	111-13	2

PART NO	NAME	NO REQ
3006-3A	5/32-7x13 TINNED	1
100-3	CLEVIS PIN	4
	1/4x28 COTTER PIN	24
111-13	CLEVIS PIN	20
3006-4R	5/32-7x13 TINNED WIRE	2
3006-5E	" "	2
3006-4E	" "	2
3006-8A	" "	1
3006-5A	" "	2
3006-4A	" "	2
3006-1A	5/32-7 NO	2

PART NO 3006 IS COMPOSED OF

DATE	CHANGED FROM	
3-24-39	ATTACHED WITH CHANGES M.E.	

WIRE CONTROL DIAGRAM

MODEL 40 — 3006

DRAWN	TRACED	CHECKED	APPROVED
C.K.L.	M.R.	[illegible]	[illegible]
11-18-38	3-24-39	4-4-39	4-4-39

IN PLACE OF — SUPER BY
NO REQUIRED — ASSY
MATERIAL
FINISH

AEROMARINE PLANE & MOTOR CO
NEW YORK, N.Y. KEYPORT, N.J.

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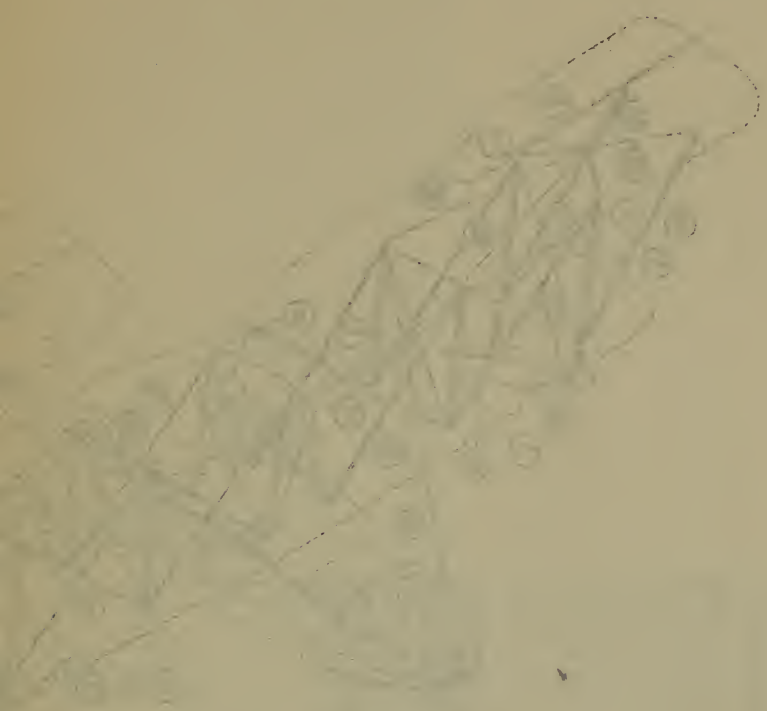
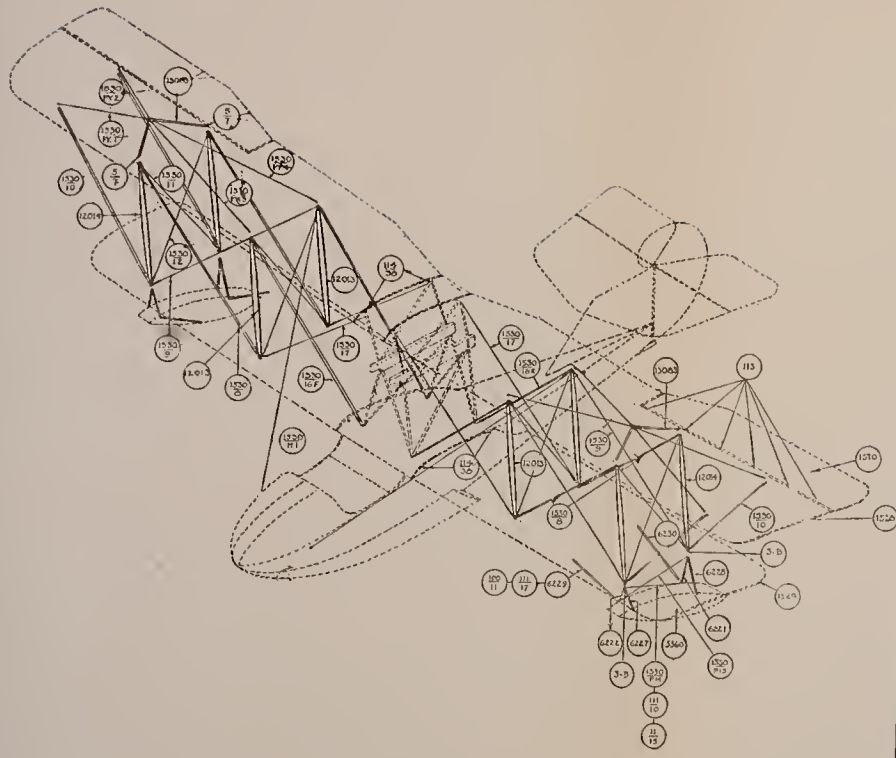
40	1542	1
MODEL	ASSY	NO REQ

FIG. 14.—WIRING DIAGRAM OF PANELS.





PART NO OF WIRE OR STRUT	NO REQD PER MACH.	DESCRIPTION OF WIRE OR STRUT	LENGTH OF WIRE INCLUDING TURNBUCKLE	No of TURNBUCKLE	No of SHACKLE	SIZE of THIMBLE	No of CLIPS FOR AT TURNBUCKLE	No of CLIPS FOR AT SHACKLE	DIAMETER OF WIRE REQUIRED	SIZE OF SWAGE REQUIRED	No REQ'D
38	4	WIRE TURNBUCKLE									
5/16 NUT	4										
10-32 NUT	4										
5-7	4	1/4" BOLT									
11-15	4	3/4" BOLT									
114-38	8	WING PIN									
113	12	WING PIN									
3560	2	WING FLOAT									
1529	1R91L	LOWER WING STRUT									
1528	1R91L	UPPER WING STRUT									
6230	2	REAR BOAT FITTING									
6222	1R91L	FRONT FLOAT STRUT									
6221	1R91L	REAR FLOAT STRUT									
6229	2	FRONT BOAT FITTING									
6228	2	REAR BOAT FITTING									
6227	2	FRONT FLOAT STRUT									
1510	1R91L	AILERON									
13083	2	PYLON STRUT									
12014	4	PYLON STRUT									
12013	4	PYLON STRUT									
1530-P15	2	" " AND WIRE									
" P14	2	" "	327 5 FT	4378-3	4	3/16 WIRE	111-10	100-11	2	5/16	4
" M1	2	" "	" "	4378-3	"	"	111-10	100-11	2	"	4
" 16R	4	" "	328 LFT	4379-1	3/16	111-13	111-15	2	"	4
" 16F	4	" "	" "	" "	"	"	111-13	111-15	4	"	8
" 12	4	" "	329 LFW	" "	"	5/16	110-17	111-15	4	"	8
" 11	4	" "	327 "	4378-4	7/16	"	111-13	111-13	4	"	8
" 10	8	" "	" "	" "	"	1/2	111-13	111-13	4	"	8
" 9	4	" "	328 "	4379-1	3/16	5/16	111-13	111-15	8	"	16
" 6	8	" "	329 "	" "	"	3/16	110-17	111-15	4	"	8
" 17	4	" "	328 "	" "	"	3/16	111-13	111-15	8	"	16
" PY4	2	" "	329 "	" "	"	3/16	110-17	111-15	4	"	8
" PY3	2	" "	327 5 FT	4378-1	7/16	"	111-10	100-9	2	"	4
" PY2	2	" "	" "	" "	"	"	111-10	100-9	2	"	4
" PY1	2	" "	" "	" "	"	"	111-10	100-9	2	"	4

PART No 1530 IS COMPOSED OF

DATE	CHANGED FROM

STRUT & WIRE DIAGRAM
WINGS

MODEL 40 | 1530

DRAWN	TRACED	CHECKED	APPROVED
C.K.L.		Malley	Rae
3-13-19		5-1-19	5-3-19

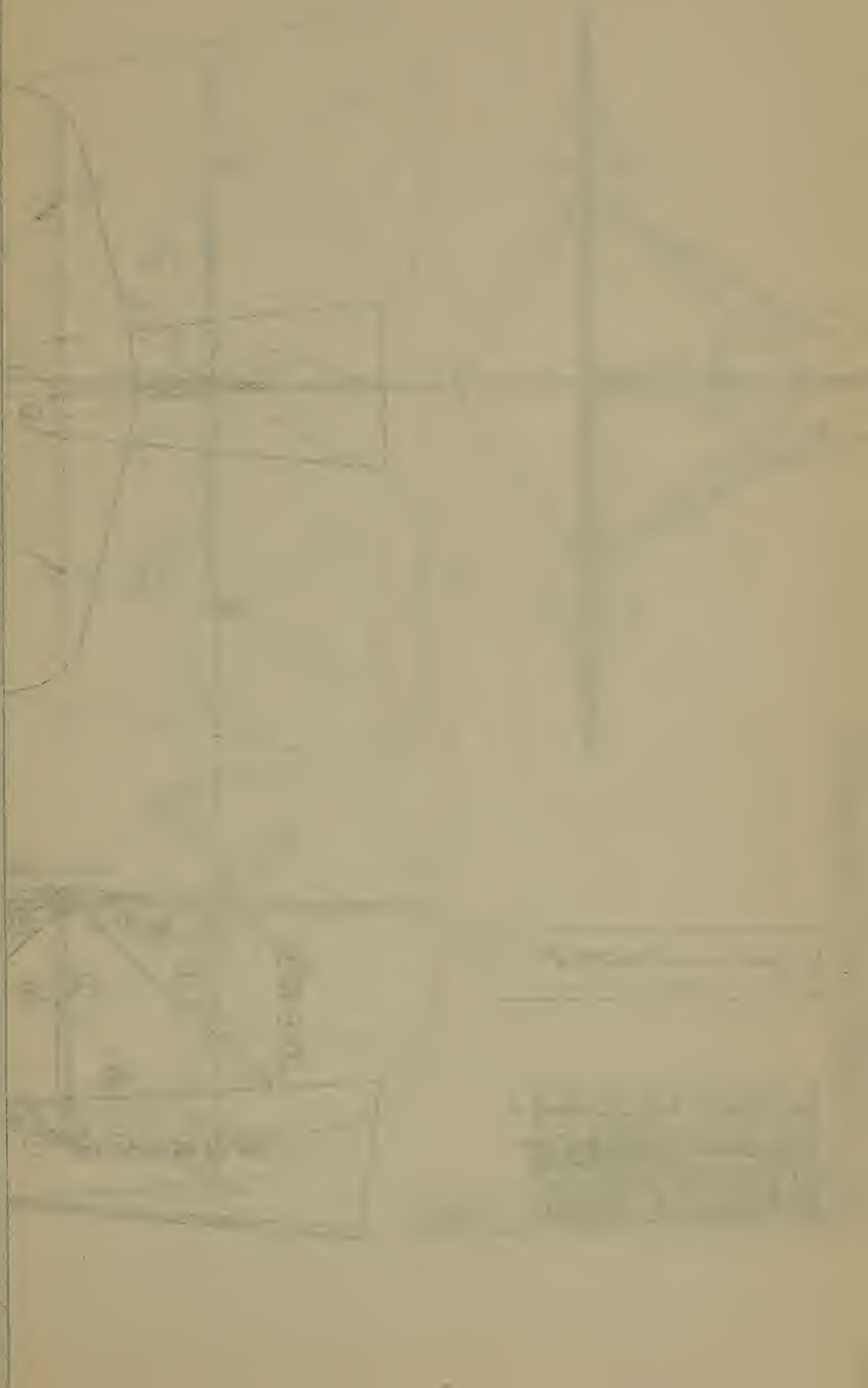
IN PLACE OF: | SUPER BY:
NO REQUIRED: | ASSY
MATERIAL
FINISH | SCALE 3/8 = 1 Foot

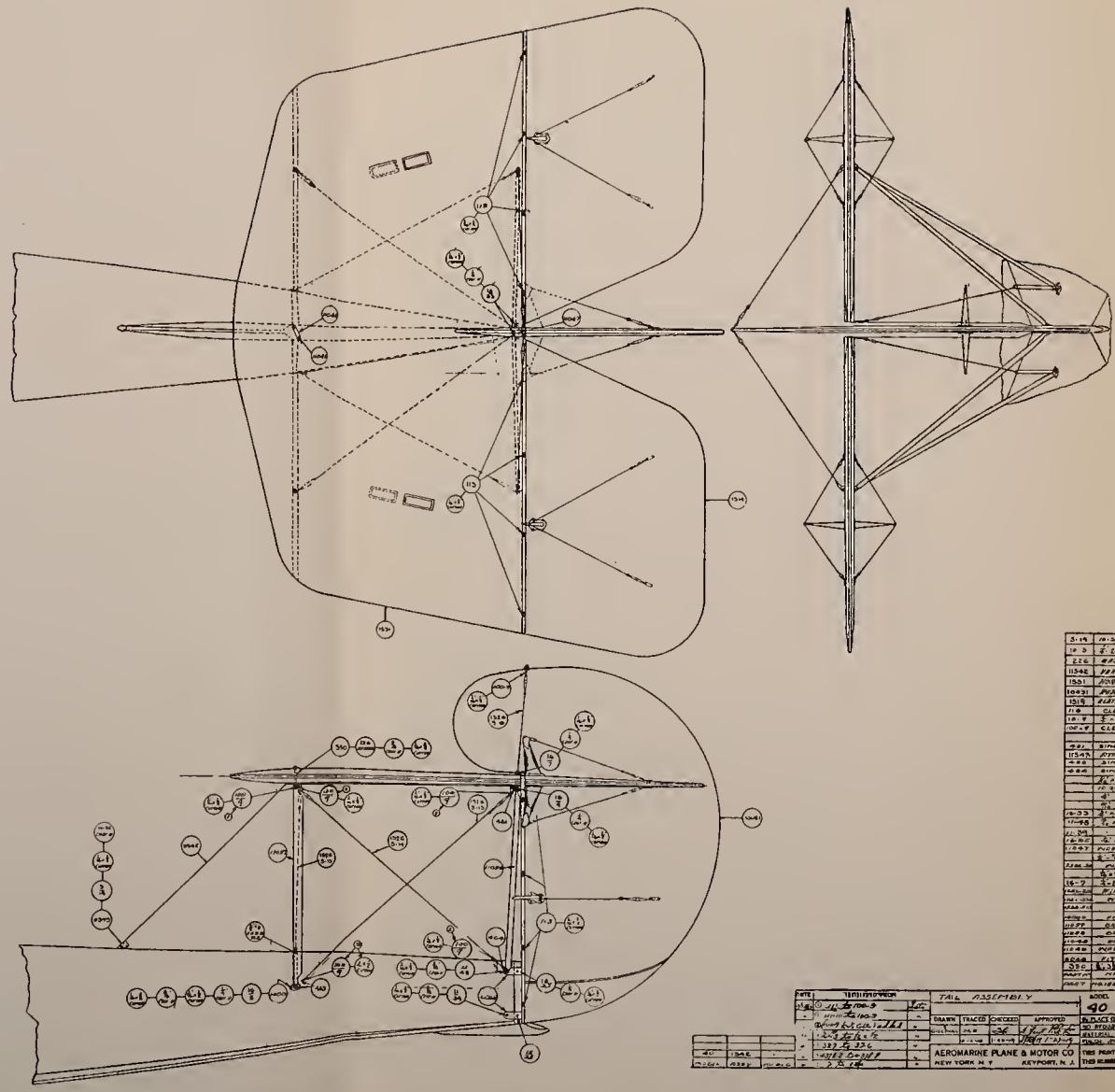
AERONAUTICAL PLANE & MOTOR CO.
NEW YORK N.Y. KEYPORT, N.J.

THIS PRINT SUPERSEDES ALL PRINTS OF THIS NUMBER PRIOR TO [redacted]

MODEL	ASSEMBLY	NO REQ'D
40	1542	1

FIG. 15.—TAIL ASSEMBLY.





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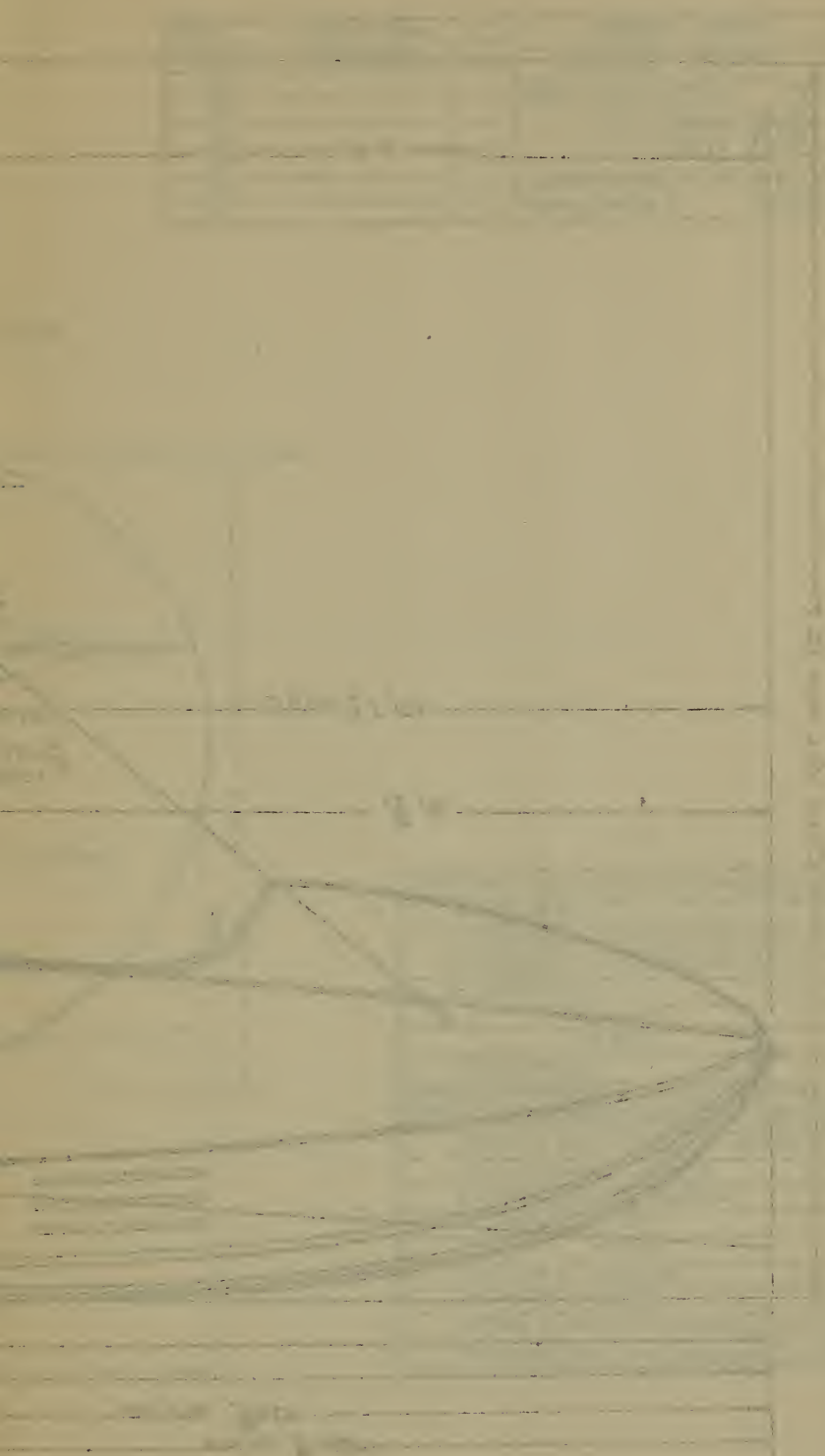
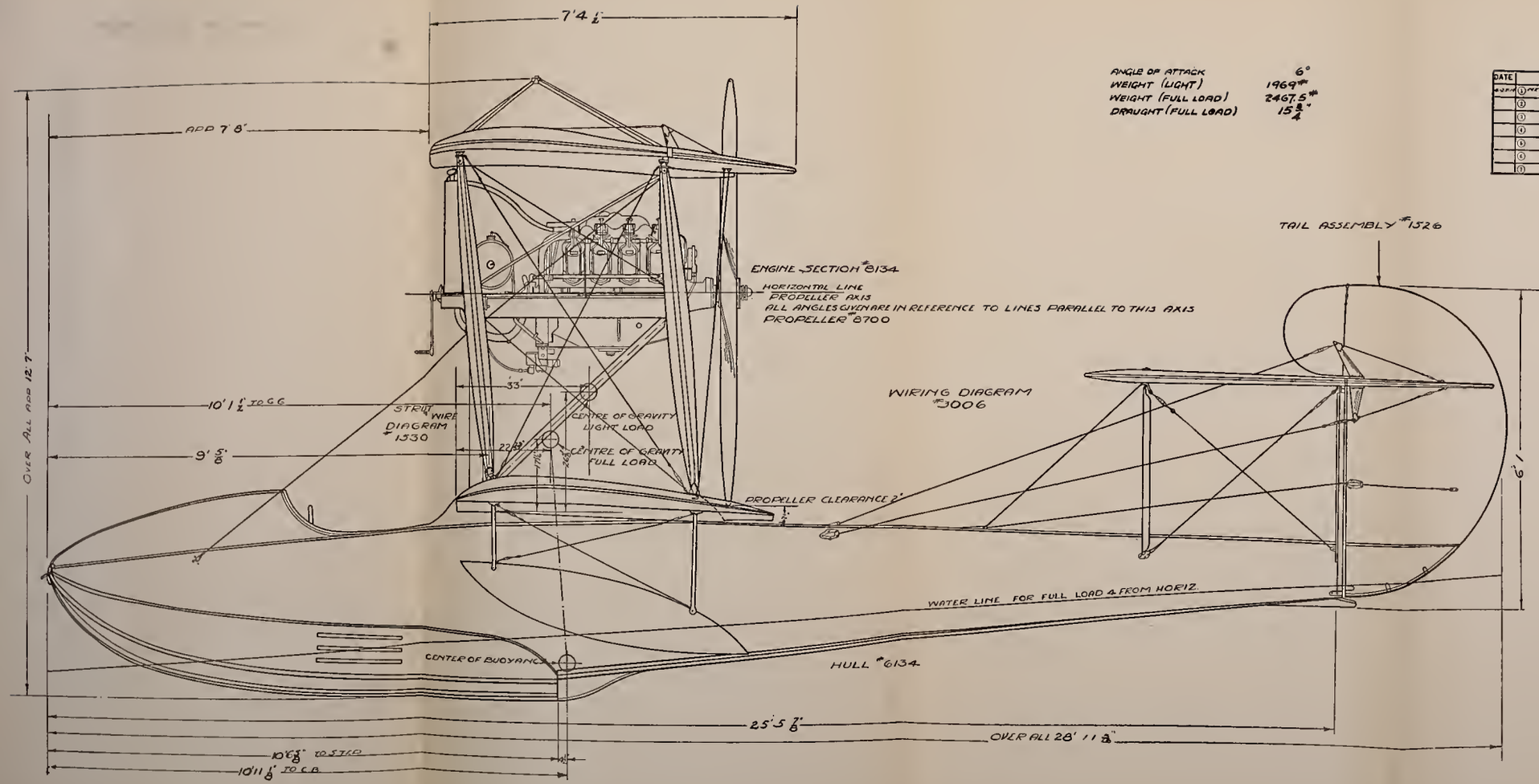
TAIL ASSEMBLY

DRAWN | TRACED | CHECKED | APPROVED

JOB 40 | 1526

FIG. 16.—SIDE ELEVATION.





ANGLE OF ATTACK	6°
WEIGHT (LIGHT)	1969#
WEIGHT (FULL LOAD)	2467.5#
DRAUGHT (FULL LOAD)	15½"

DATE	CHANGED FROM	
4-25-19	① NEW RADIATOR INSTALLED	MR
	②	
	③	
	④	
	⑤	
	⑥	
	⑦	

SIDE VIEW
FLYING BOAT

MODEL 40 1542

DRAWN	TRACED	CHECKED	APPROVED
	M.R. Master	Mallon	
4-25-19	4-1-19	4-7-19	5-1-19

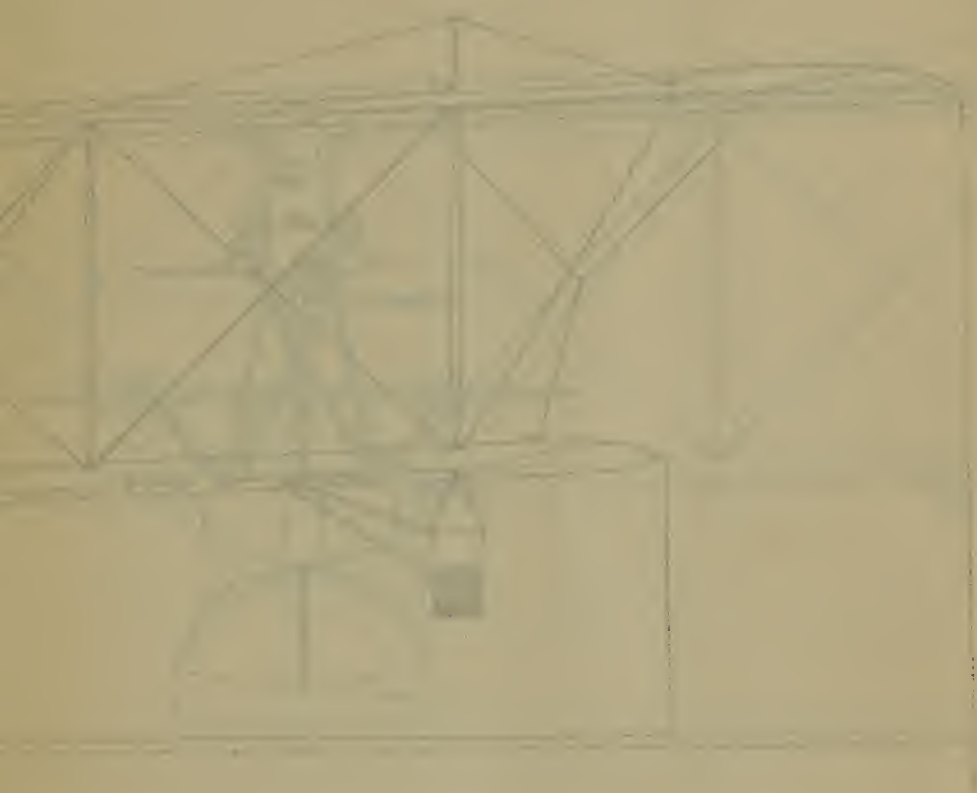
IN PLACE OF | SUPER. BY
NO REQUIRED | ASSY
MATERIAL
FINISH

AEROMARINE PLANE & MOTOR CO.
NEW YORK, N.Y. KEYPORT, N.J.

THIS PRINT SUPERSEDES ALL PRINTS OF
THIS NUMBER PRIOR TO.

CHARACTERISTICS OF MODEL 40 FLYING BOAT	
RUDDER	17.39 sq ft
SPREAD UPPER WING	46'6"
SPREAD LOWER WING	37'0"
STAGGER	0"
CORD	73"
GAP	78"
DIHEDRAL	176"
TOTAL SUPPORTING SURFACE INCLUSIVE OF AILERONS	330.4 sq ft
AREA OF UPPER WING INCLUDING AILERONS	304"
AREA OF LOWER WING	200"
AILERONS EACH	29"
ELEVATORS EACH	12.8 "
STABILIZER	39 "
FIN	15" "
SWEEP BACK	NONE
WING CURVE	RAF 6
ANGLE OF INCIDENCE UPPER WING	3.5°
ANGLE OF INCIDENCE LOWER WING	2°

FIG. 17.—FRONT ELEVATION.



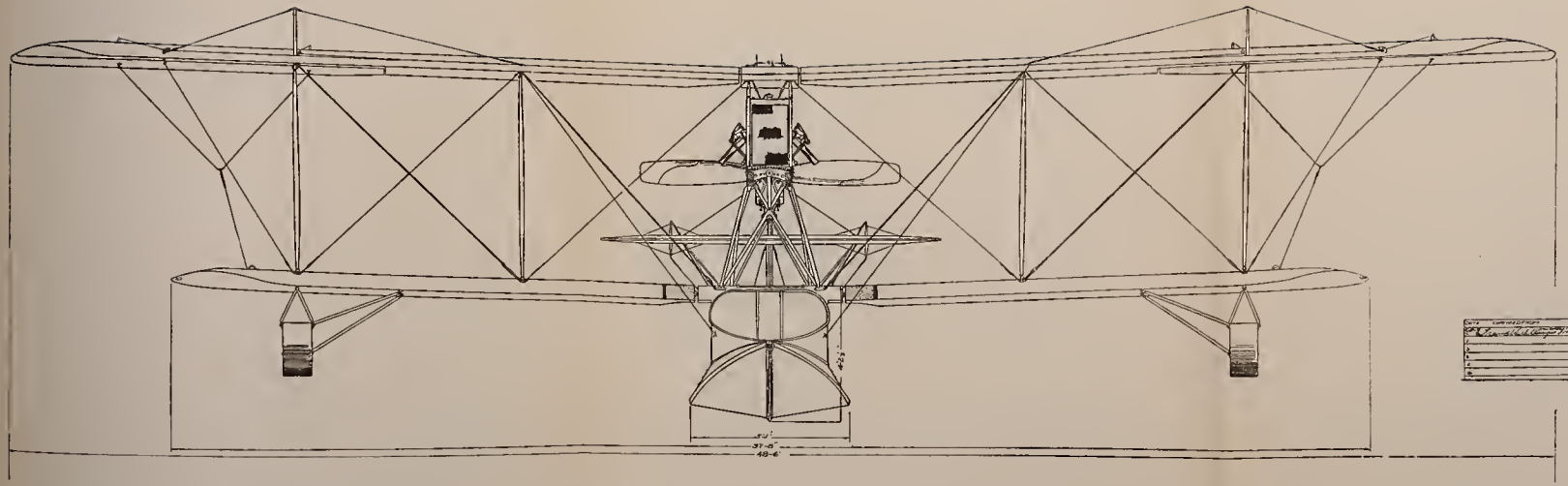

FRONT VIEW
FLYING BOAT
40
1541

FIG. 18.—PLAN.

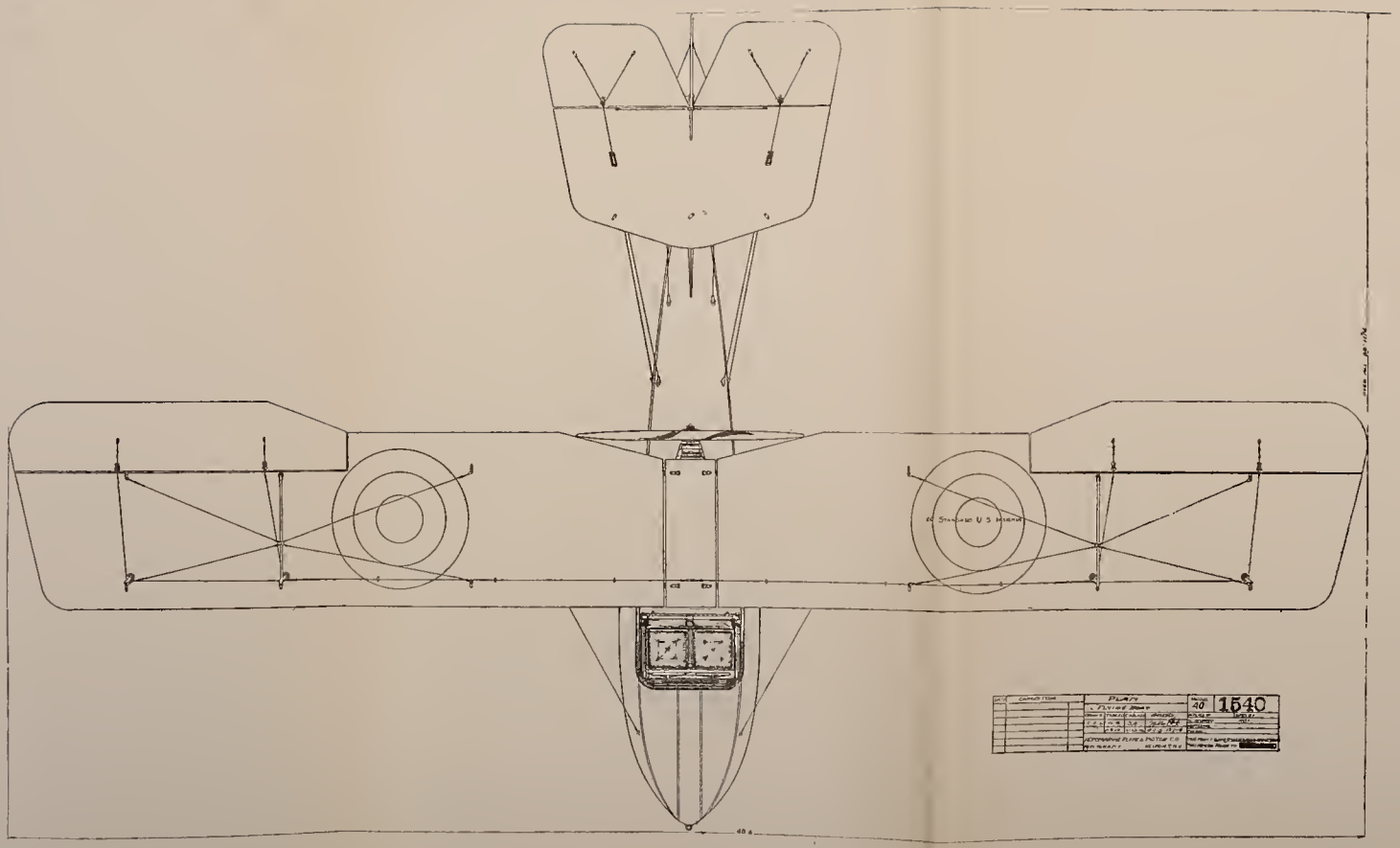


PLATE
40
1540

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